OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

FEBRUARY 20, 1950
VOLUME 39, NO. 4

AMERICAN DYESTUFF REPORTER

DEVOTED TO TEXTILE CHEMISTRY • BLEACHING • DYEING • PRINTING • FINISHING

GREENVILLE PUBLIC LIBRARY 3-4

For bright greenish-blue shades

Du Pont Anthraquinone BLUE 4GL possesses the generally good characteristics of other anthraquinone acid blues. It yields bright greenish-blue shades that have good fastness to light, dry cleaning, steaming and perspiration. Resistance to crocking, hot moist pressing and cold-water spotting is very good. Solubility is excellent.

Du Pont Anthraquinone Blue 4GL is recommended for dyeing women's wear, blankets, knitting yarns for sweaters and other uses where bright greenish-blue shades are desirable. It is also an ideal color for producing white effects in materials containing effect threads of acetate or viscose rayon or cotton.

For information on this new acid dye...or for help on any coloring problem . . . consult our Technical Staff. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Div., Wilmington 98, Del.

Always dye with an eye to the end use

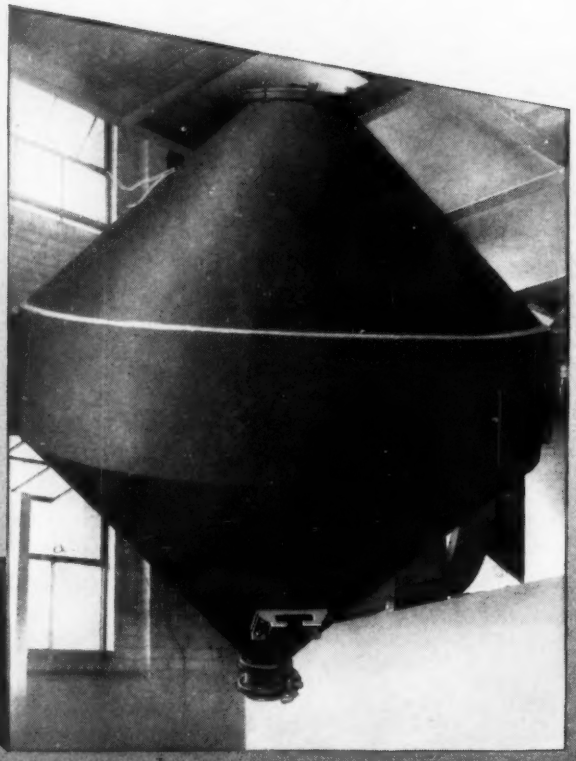
Du Pont Dyestuffs

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

the BIGGER the blender

the BETTER the uniformity



These powerful, Giant Blenders were built to comply with our specifications for rigid control, to give you a superior product. They make possible more uniformity in standardization of the dye as manufactured.

As a result, we can always standardize ALTCO colors more uniformly than with usual equipment, thanks to our more modern methods of Dye-Making.

Pace-setter in precision dye-making

ALTHOUSE

Chemical Company, Inc.

READING · PA.

AMANTHRENE* VAT COLORS
provide the answer to the demand for
better color fastness in textiles

NEWLY IMPROVED!!!
investigate this superior Vat Color

Amanthrene

BROWN RRD

in paste or
double powder form

Advantages of this Vat Brown include a full, chocolate shade, printing excellence, *including quick ageing,* and all round good fastness as applied to cotton and rayon . . . Primarily a printing color but easily adapted to the dyeing of these fibres.

A homogeneous, *non-drying* paste or a finely divided, dispersible powder offers further advantages.

Another of the Amanthrene range of superior vat colors. For detailed information on the whole range available, as well as data regarding your own particular requirements, consult our nearest branch. A.A.P. technicians are always happy to be of service.

AMERICAN ANILINE PRODUCTS, INC.

50 Union Square, New York, N.Y. • **Plant: Lock Haven, Pa.** • **Branches:** Boston, Mass. Providence, R. I. • Philadelphia, Pa. • Charlotte, N. C. • Chicago, Ill. • Los Angeles, Cal. Chattanooga, Tenn. • **Dominion Anilines & Chemicals Ltd.** • Toronto, Canada • Montreal, Canada

*Reg. U. S. Pat. Off.

Why you should specify...

HOOKER MURIATIC ACID

IF YOU MANUFACTURE DYES—because Hooker Muriatic Acid is free from sulfates, oxides of nitrogen and iron, impurities that cause precipitates or add unwanted colors to benzidene dye.

IF YOU ARE REFINING HIGHGRADE ORES—because Hooker Muriatic Acid is free from sulfates or sulfuric acid, that cause serious losses in extraction.

IF YOU ARE MAKING PHARMACEUTICALS OR FOOD STUFFS—because Hooker Muriatic Acid is free from sulfates, iron and arsenic, that cause insoluble precipitates, discoloration or contamination.

IF YOU ARE PICKLING OR CLEANING METALS — because Hooker Muriatic Acid is free from arsenic, that may react with liberated hydrogen to form Arsine (AsH_3).

IF YOU MANUFACTURE CHEMICALS—because Hooker Muriatic Acid is of such high quality that you get better yields of better quality and without harmful side reactions.

* * *

Hooker Muriatic Acid is available in two grades—commercial (light yellow color) and Hooker White— (colorless) both free from arsenic. It is shipped in carboys or tank cars and in three strengths, 18°, 20° and 22° Baume. Hooker Technical Data Sheet No. 720 gives Hooker specifications, dilution instructions and other valuable information. Send for a copy on your company letterhead.

From the Salt of the Earth

HOOKER ELECTROCHEMICAL COMPANY

HOOKER CHEMICALS

2 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.
NEW YORK, N. Y. • WILMINGTON, CALIF. • TACOMA, WASH.

9-1143

SODIUM SULFIDE • SODIUM SULFHYDRATE • SODIUM TETRASULFIDE • CAUSTIC SODA • MURIATIC ACID • PARADICHLOROBENZENE • CHLORINE

American Dyestuff Reporter, Vol. 39, No. 4, February 20, 1950. Published every other Monday. Copyright 1950, by Howes Publishing Co., Inc., One Madison Ave., New York 10, N. Y. Domestic subscription, $5.00; Canadian, $6.00. Foreign, $10.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

National Aniline Dyes

are

Outstanding Colors

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL AND DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Philadelphia Chicago
San Francisco Portland Ore. Greensboro Charlotte
Atlanta New Orleans Chattanooga Toronto

Newsworthy onyx Chemicals

FOR TEXTILE PROCESSING

ETERNALURE*

More hose are finished with Eternalure resin finish for nylons than with the finishes of any other manufacturer. It imparts a smart "selling" finish that lasts for the life of the hose, and effects many economies in the finishing operation.

XYNO RESIN DISPERSIONS

A series of thermoplastic linear addition resins supplied in aqueous dispersions. They have a wide range of use in textile finishing, and require no curing or heat treating.

Xyno Resin AA40

A water-thin dispersion of moderate particle size used as a general purpose finish for cotton and rayon fabrics.

Xyno Resin 362

A viscous vinyl resin dispersion of large particle size. It provides the stiffest hand of all the series. It is used for cotton, rayon, acetate and nylon fabrics, and is widely used on organdies, ninons and marquisettes.

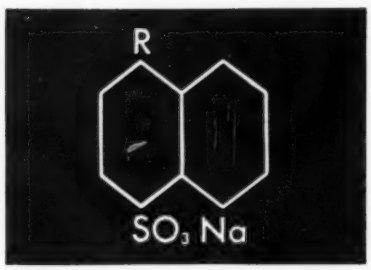
Xyno Resin S69

A water-thin dispersion of fine particle size, offering the best wash resistance of the series. It increases wear resistance, and gives a wide range of sizing, stiffening and impregnating effects on all common fabrics. Xyno Resin S69 provides a notable decrease in slippage on acetate goods.

THE ONYXSANS*

Cationic softeners that provide a permanent finish on cottons, acetates, viscose and bembergs . . . and excellent durability on other fibers. The Onyxsans are capable of providing a wide range of hands from the soft fluffiness of a kitten's fur to the mellow finish of printed rayon and cotton draperies.

Sorolene* G—Low Cost Anionic Wetting Agent with Excellent Dispersing Properties



Chemically, Sorolene G is the sodium salt of an alkyl naphthalene sulfonic acid. It is an exceptionally fast wetting agent with moderate foaming action. It has a wide field of usefulness as an assistant in many detergent processes. Its dispersing characteristics are most useful in pasting up dyes, and in levelling and penetrating action in dyeing. Low in first cost, its effectiveness in low concentrations makes Sorolene G a very economical material to use.

Properties

Sorolene G is sold in paste form, and contains 28% active ingredient. It is compatible with hard water and moderate concentrations of metallic salts, and is stable in both acid and alkaline solutions.

WETTING ACTION (Draves Test)

Concentration	Wetting Time in Seconds		
	25° C.	40° C.	60° C.
0.5%	10 Sec.	7 Sec.	6 Sec.

Suggested Uses

Wetting Agent

•

Assistant in Scouring

•

Assistant in Boiling Out Cotton Goods

•

Levelling and Penetrating Agent in Dyeing

•

Pasting-Up All Types of Dyes

ESTRAMINE . . . A New Low-Use Cost Non-Ionic Detergent and Emulsifying Agent.

Estramine is a fatty acid alkanolamine condensate in liquid form, with 95% active material. Compatible with anionic and cationic materials, it is a highly effective detergent and wetting agent for a great many textile processing operations. It is of particular value as a dispersant for heavy dye solutions. Because of its powerful detergent action, it is being used in place of soap in many operations, notably in the scouring and fulling of wools and worsteds. It leaves the fabric in a soft, porous, unusually receptive condition for subsequent finishing.

XYNO RESIN R . . . A Completely Water-Soluble Resin Finish.

Xyno Resin R is a completely water-soluble resin finish, available as a 50 per cent active aqueous solution.

It was developed primarily as a non-curing finish for imparting a broad range of desirable hands to synthetics, particularly acetates, without introducing mark-off or dull effects. It has been used with marked success on conventional equipment on taffetas, foulards, jacquards and tie fabrics.

A particularly interesting application of this resin is as a stiff, lustrous finish without mark-off on acetate ribbon.

If you are concerned with stiffening effects on any synthetic materials, you will find Xyno Resin R worth investigating.

*Trade Mark Reg. U.S. Pat. Off.

onyx

ONYX OIL & CHEMICAL COMPANY, JERSEY CITY 2, N. J.

CHICAGO • BOSTON • CHARLOTTE • ATLANTA

the liquid bite...

...FATS BECOME SOAP

From soap to rayon, powerful Caustic Soda plays an important part in the preparation of a multitude of products used every day. In the conversion of cellulose into rayon — in the saponification of fatty oils into soap — in hundreds of ways Caustic Soda contributes to the country's manufacturing processes.

From Niagara Falls to Texas, fourteen great plants make Mathieson a major force in the manufacture of the five basic heavy chemicals — caustic soda, soda ash, ammonia, chlorine and sulphuric acid — and their allied products. Mathieson is a single source of supply for all five of these chemicals indispensable to industry, agriculture and public health.

Mathieson
CHEMICALS

Mathieson Chemical Corporation
MATHIESON BUILDING,
BALTIMORE 3, MARYLAND

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

WHY USE 2 DE-SIZING AGENTS WHEN 1 WILL DO BOTH JOBS?

AMPROZYME

THE NEW DOUBLE-ACTION DE-SIZING AGENT CONVERTS BOTH STARCHES AND PROTEINS IMMEDIATELY AND IN ONE OPERATION

There is no need for two different de-sizing agents or for two different de-sizing operations when you use AMPROZYME. If the size is starch, its amylolytic enzymes go right to work. If a protein size is present, its proteolytic enzymes take up the attack. AMPROZYME digests either or both at the same time and in the same operation.

AMPROZYME, furnished in powder form, can be used at all normal dye box temperatures and in a wide pH range. Its rapid double-action insures quick and complete de-sizing of cottons, rayons and mixed goods, producing a good hand and fine finish for even dyeing without streaks, shading or blemishes.

When you use AMPROZYME you do more than effect economies in de-sizing operations. You reduce storage, handling and shipping costs as well, for you have one product that does *two* jobs. You're never out of the proper de-sizing agent with double-acting AMPROZYME.

Send the coupon today for full information on AMPROZYME and a sample for a test run. Why buy two products when one will do both jobs?

JACQUES WOLF & CO.
Chemicals PASSAIC, N. J.

Manufacturers of Monopole Oil, Superclear, Hydrosulfites, Oratol L-48, Lamar PW, and other chemical specialties

AMPROZYME AMPROZYME AMPROZYME AMPROZYME AMPROZYME

(AD 2-50)

JACQUES WOLF & CO., Passaic, N. J.

☐ *I want to know more about AMPROZYME.*

☐ *I would like sample for a test run.*

NAME_____

TITLE_____

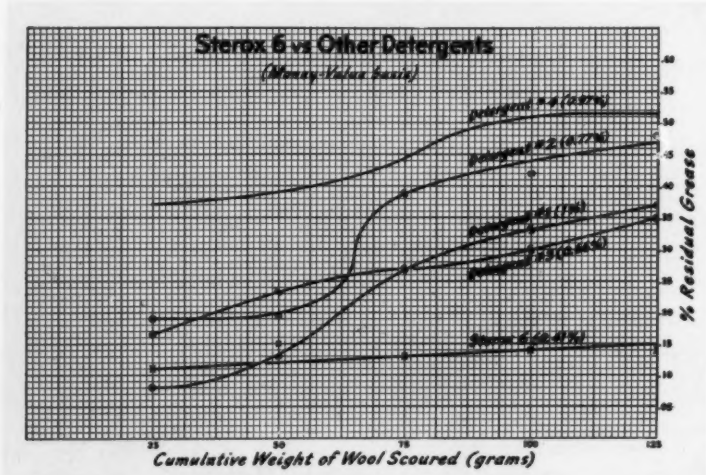
COMPANY_____

ADDRESS_____

CITY & STATE_____

STEROX 6

a detergent for wool scouring



One of your toughest cleaning jobs, wool scouring, is handled quickly and efficiently with a special Monsanto detergent, Sterox 6. Sterox 6 is the result of extensive research on synthetic detergents, wetting agents and cleaning compounds. In practical operation in mills, Sterox 6 is demonstrating unusually high efficiency in the removal of oil and grease from wool fibers.

Sterox 6 is a detergent that differs greatly in chemical composition and action from any other detergent.

Results in mills show that Sterox 6 is outstanding, not only for the removal of oil and grease, but also for its ability to hold them in suspension without redeposition on the fiber.

Further tests show that Sterox 6 is more efficient than other detergents on a *money-value* comparison.

Write today for available technical information which will show you how Sterox 6 will make scouring easier and more economical in your plant. Just send the handy coupon.

Cotton and Rayon Mills get seven advantages with Catalyst AC

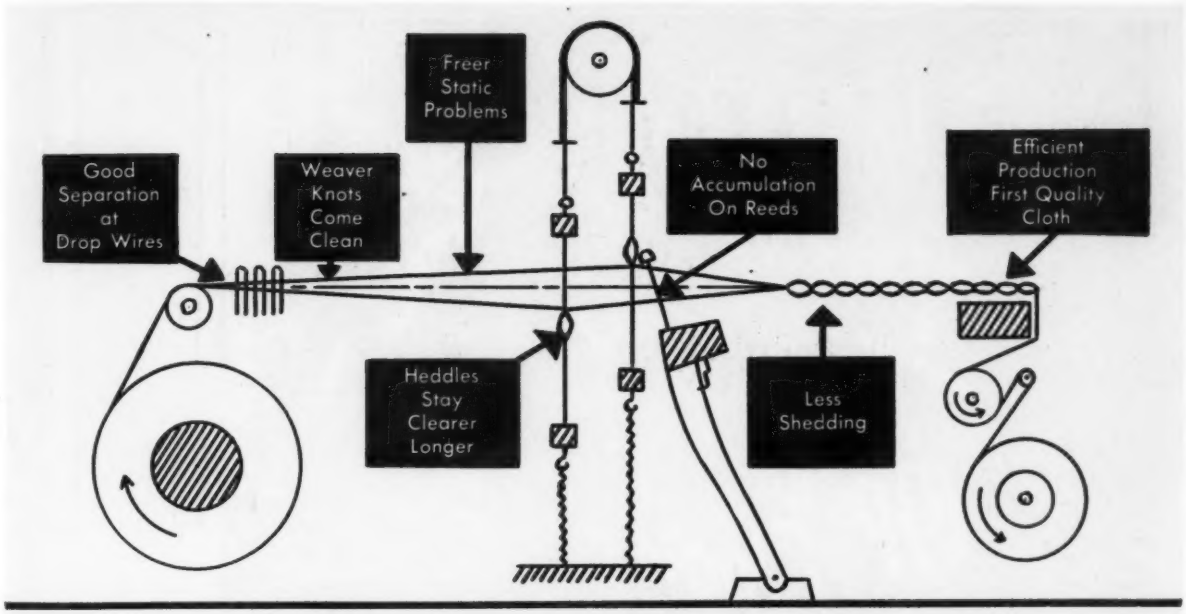
Catalyst AC was developed to eliminate two main difficulties mills met with diammonium phosphate: short bath life, and incompatability with useful softeners and penetrants.

Catalyst AC overcomes these difficulties and gives mill men a number of added advantages. With Catalyst AC you get:

1. Reduced odor problem.
2. More than twice the useful bath life gained with diammonium phosphate.
3. Resin retention at least equal, and in most cases substantially better than diammonium phosphate.
4. Curing rates equal to, or substantially faster than those with diammonium phosphate.
5. A softer, more desirable hand on cotton and rayon fabrics where crush resistance, shrinkage control, and stability is required.
6. Elimination of refrigerating baths.
7. Compatability with most cationic, anionic, and non-ionic softeners and penetrants.

Catalyst AC now available in steel drums

Monsanto has switched Catalyst AC containers from glass carboys to non-returnable steel drums. The move eliminates returns and deposits, makes Catalyst AC easier and more economical to handle!



Advantages of Stymer Size

How more and more mills make acetate weaving faster, easier

Many of the largest and best-known mills are ordering and re-ordering Stymer. No better proof that Stymer delivers results, technically and economically. In addition to weaving, Stymer gives you these advantages in slashing: Easily mixed and large mixes can be stored for long period; does not gel when cold and will not clog pipes or valves; no static build-up and a minimum build-up on cans; smooth warps and easy splits at the "bust bars;" allows low-temperature drying; no can covers necessary; no throwaway and no scum in size box; possible elimination of squeeze roll jackets.

For full information on Stymer, please send the coupon below.

MONSANTO
CHEMICALS AND PLASTICS
SERVING INDUSTRY...WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY, Textile Chemicals Dept.
Everett Station, Boston 49, Mass., Dept. ADT 29

Please send me information on
- ☐ Stymer
- ☐ Catalyst AC
- ☐ Sterox 6

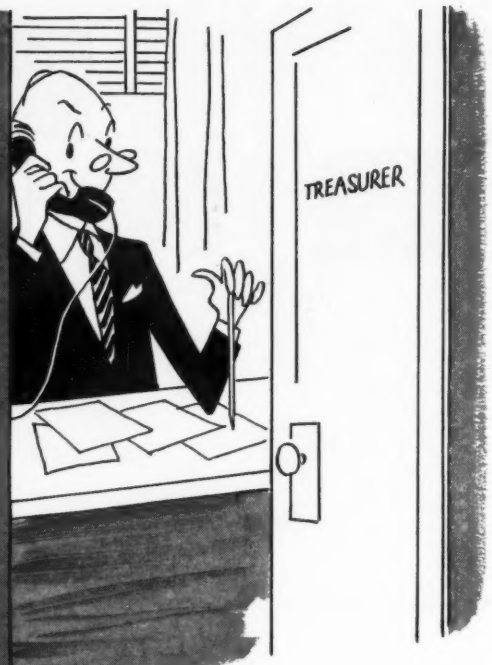
Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

How Threshold Treatment Opens Doors*



THE TREASURER initialed the final draft of the yearly statement and phoned the Superintendent. "I thought you'd like to know," he said, "that the final figures show we had a big year. You fellows did a good job down there."

The Superintendent said, "Fine. Come down and see us some time and we'll show you how we do it."

FIFTEEN MINUTES later the Superintendent, the Dyer and the Chemist were grouped around the Treasurer. "Let's start here," the Superintendent suggested. "This is where the plant water supply gets Threshold Treatment with Calgon.†"

The Treasurer said, "That's good."

"It sure is," the Superintendent said. "A few parts per million of Calgon stop rust. New piping costs a lot more than Calgon."

"PIPING COSTS!" the Dyer broke in. "Have you ever tried to get clear colors with some of these dyes when there's a lot of iron in the water? Threshold Treatment with Calgon cuts iron content from 2 parts per million to less than .1 part. We get brighter shades and faster colors—and there's no expensive stripping and re-dyeing. That's where Calgon gives us real savings."

"SPEAKING OF SAVINGS," the Chemist spoke, "you might check our peroxide bill for last year. Calgon reduces iron pick-up, so we use less bleach. That's an extra dividend we get from our Calgon investment."

The Treasurer glanced at his watch. "This Calgon sure makes nice conversation but I'm afraid I'll have to get back. Anyway, I'm glad you fellows told me all about it."

"ALL?" the Superintendent said, "We're using Calgon in a dozen other applications where it is just as essential."

"And," chimed in the Chemist, "we haven't even mentioned Calgon's technical service. New problems keep coming up in this business—and Calgon, Inc. is right there with help when we need it."

* *to bigger profits, that is.*

†T. M. Reg. U. S. Pat. Off.

HAGAN HALL BUROMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING PITTSBURGH 30, PA.

A resin for better shrinkproofing
on **RAYON!**

FABrez
10

A resin for better crease resistance
and resiliency
on **RAYON!**

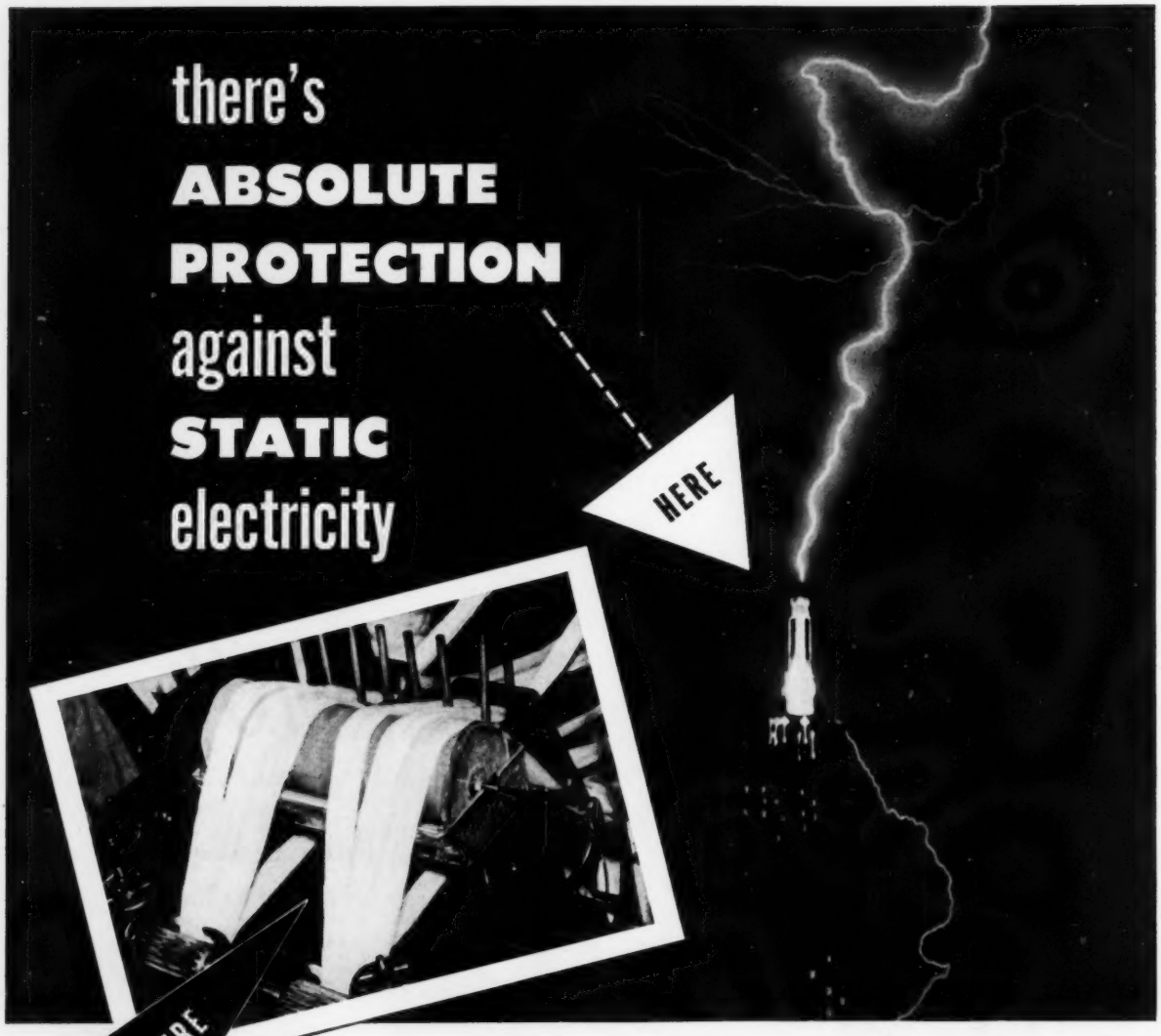
FABrez F-10 is a member of one of the most outstanding families of synthetic resins in the world . . . Reichhold Synthetic Resins. Complete FABrez technical information on request.

BETTER TEXTILE PROCESSING THROUGH *Better Textile Chemicals*

ATLANTIC CHEMICAL CO. INC.
MAIN PLANT — CENTREDALE, RHODE ISLAND

RCI Use ATCO Products

there's **ABSOLUTE PROTECTION** against **STATIC** electricity



Today's architects and builders have the means to protect their creations from electricity on the rampage . . .

. . . and today's WORSTED manufacturers have the means to protect the quality of their products from mischievous electricity—STATIC that plays havoc with desirable yarn production. For Nopco's new, specifically developed lubricant —NOPCO* 1656-R—provides an anti-static oil that assures better WORSTED production.

Fibres treated with Nopco 1656-R remain static free throughout carding, gilling, combing and drawing—in spite of today's speeded up processes. Result: "Wild" and broken ends are avoided, and even-running yarn is assured.

Nopco 1656-R successfully replaces any conventional lubricant you are now using. It is applied in the same manner . . . no changes in equipment or methods are needed. Whatever your production system—American, Bradford or French—this remarkable new oil can be used with great advantage to produce HIGH QUALITY WORSTED YARNS economically.

Ask your Nopco representative for full information about 1656-R — or write to us directly.

NOPCO TRADEMARK EVOLVED THRU RESEARCH

NOPCO CHEMICAL COMPANY

Formerly National Oil Products Company

HARRISON, NEW JERSEY

Branches: Boston • Chicago • Cedartown, Ga. • Richmond, Calif.

*Reg. U. S. Pat. Off.

ALGOSOLS

water soluble vat dyestuffs

new method for application of vat dyes

complete color range the same brilliant shades as the vat dyestuffs from which they are derived.

fastness all the fastness properties of regular vats.

versatility vat fastness on mercerized cotton piece goods and cotton yarn . . . rayon skein and piece goods . . . dress goods of spun rayon and wool blends . . . wool suitings, blankets and knitting yarns . . . hosiery of wool and blends of rayon, cotton and nylon . . . printing by roller, screen and resist.

application simplicity of application, superior dyeing and printing results, saving of time, lower cost of chemicals offset dye cost over ordinary vats in light and medium shades.

deliveries stocks carried in strategically located warehouses throughout the country insure prompt deliveries.

GENERAL DYESTUFF CORPORATION

435 HUDSON STREET • NEW YORK 14, NEW YORK

BOSTON, MASS. • CHARLOTTE, N. C. • CHICAGO, ILL. • PHILADELPHIA, PA. • PORTLAND, ORE. • PROVIDENCE, R. I. • SAN FRANCISCO, CALIF.

You get 4-Way Protection PLUS Economy with ANCHORFAST NAILS

1. Hold like a screw, yet drive like a nail.
2. 100% rustproof. They're made of MONEL.
3. Strength equal to steel; extra stiffness.
4. Corrosion-resistant . . . won't contaminate solutions.

Conveyor trucks in service at Packard Mills, Inc., of Webster, Mass. These trucks are used to transport piece goods from scouring room to dye house. Sulphuric acid drippings from the goods caused ordinary nails to fail rapidly in this application. Packard Mills maintenance men switched to 2" Anchorfast Nails —and have had no further corrosion troubles!

With *Anchorfast*† *Nails,* you get the holding power of a screw at the cost of a nail. You may eliminate hole-drilling and setting compounds. AND you get outstanding protection from rust and corrosion.

These are the features that make *Anchorfast Nails* favored fastenings among textile processors.

Because they're made of rustproof, corrosion-resistant MONEL*, *Anchorfast Nails can't* rust or harmfully contaminate solutions.

Their extra stiffness means less spoilage under the hammer. Still another valuable feature . . . the special annular grooves around the shank of *Anchorfast Nails* prevent "pulling out" caused by alternate swelling and shrinking of the wood. This makes it possible to use *Anchorfasts* in conditions of sharply varying humidity where ordinary nails would fail.

Leading fabric processing plants use *Anchorfast Nails* as fastenings for vats, tubs, ducts, floors, ceilings, conveyor trucks — wherever adverse conditions of stress, humidity, and chemical corrosion must be defeated.

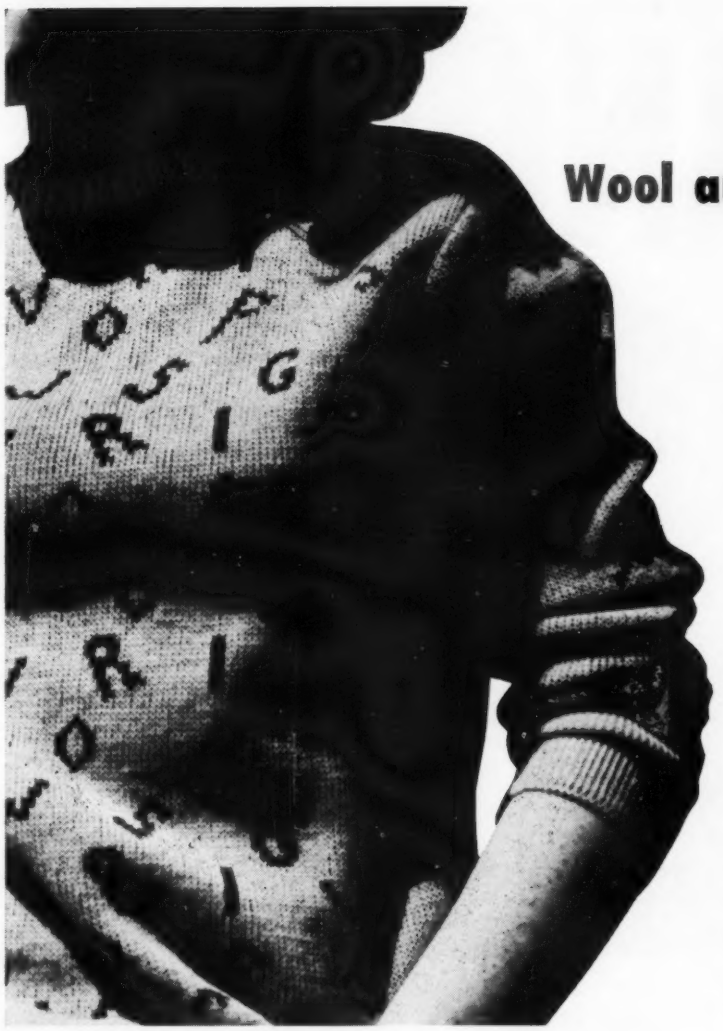
Anchorfast Nails may be the answer to many of *your* fastening problems, too. Why not investigate their unusual advantages today? Write for FREE testing device and list of distributors.

*Reg. U.S. Pat. Off. International Nickel Co.
†Reg. U.S. Pat. Off. Independent Nail & Packing Co.

Monel*... *for lower maintenance

EMBLEM OF SERVICE INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.



Wool and the ULTRAWETS

From raw wool to finished sweater . . . much of the processing involved can be improved by using the ULTRAWETS—a family of alkyl aryl sulfonates tailor-made for particular jobs. For example:

IN CARBONIZING RAW WOOL: The problem of finding an economical low foaming wetting agent which is stable to acid to facilitate the removal of the cellulosic impurities from the raw wool is solved by using liquid ULTRAWET 30E or ULTRAWET 30DS.

IN SCOURING RAW WOOL, YARN, AND PIECE-GOODS: Liquid ULTRAWET 35KX is the most economical alkyl aryl sulfonate for volume use. Flake ULTRAWET K or bead ULTRAWET SK where dried products are desired.

IN DYEING: The liquids ULTRAWET 30E and ULTRAWET 30DS are particularly efficient as dye leveling agents.

Wool is just one of the textile fibers with which the ULTRAWETS are being used. They are equally important in the processing of cotton and synthetic fibers. We'll be glad to send you a brochure which will give you the facts about the whole ULTRAWET family. The Atlantic Refining Company, Chemical Products Section, 260 S. Broad St., Philadelphia 1, Pa.

ATLANTIC

PETROLEUM CHEMICALS

In the East
THE ATLANTIC REFINING COMPANY
Philadelphia • Pittsburgh • Providence
Charlotte • Chicago

On the West Coast
L. H. BUTCHER COMPANY
San Francisco • Los Angeles • Seattle
Salt Lake City • Portland • Oakland

In Canada
NAUGATUCK CHEMICALS
Division of Dominion Rubber Co., Ltd., Canada
Elmira • Montreal • Toronto • Windsor
Winnipeg • Saskatoon • Calgary

KERANOL N K

gives **COTTONS AND RAYONS**

a very **DESIRABLE, SOFT, FULL HAND**

durable to **WASHING AND DRY-CLEANING**

Unaffected by pH variations in the finishing bath—compatible with Resins—very resistant to yellowing, even at excessively high temperatures. Write for our technical service bulletin #208-110.1

IT'S AN Arkansas PRODUCT!

CO., INC.

NEWARK, NEW JERSEY

For Your

AZO DYES

Here's how to remember *The Secret of Quality*

SOLVAY
TRADE MARK REG. U.S. PAT. OFF.
SODIUM NITRITE
U. S. P.

Use Solvay for Purity

SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit
Houston • New Orleans • New York • Philadelphia • Pittsburgh
St. Louis • Syracuse

Here's a *SALES* tag for your wool product that *SELLS!*

THE WOOL
IN
THIS PRODUCT
IS
COMPLETELY
WASHABLE
. . . SHRINK RESISTANT
Because it's
Schollerized
Regardless of how often it is washed, it will never mat or felt . . . never shrink out of fit or lose its original comfort . . . It will always retain its original "hand" or feel, its fine wool appearance and texture, its elasticity, resiliency, recoverability — FOR THE LIFE OF THE FABRIC!

Because Schollerizing adds no foreign material to the wool — takes nothing from the wool — its weight remains unchanged. Tensile strength is unaffected or increased.

Application of the Scholler Shrinkage Control Process to the wool is notably simple yet results are consistently uniform! Your dyer or finisher can readily Schollerize* your wool product or fabric for you!

*U. S. & Foreign Patents Pending

YES . . . SCHOLLERIZED WOOL IS **BETTER** WOOL **BECAUSE** IT'S SCHOLLERIZED!

SCHOLLERIZING is the essence of simplicity in application — consistently uniform in results. Your own dyer or finisher can Schollerize your wool product or fabric for you!

SCHOLLER BROTHERS, INC.

Manufacturers of Scouring, Dyeing and Finishing Materials

COLLINS at WESTMORELAND, PHILADELPHIA 34, PA.

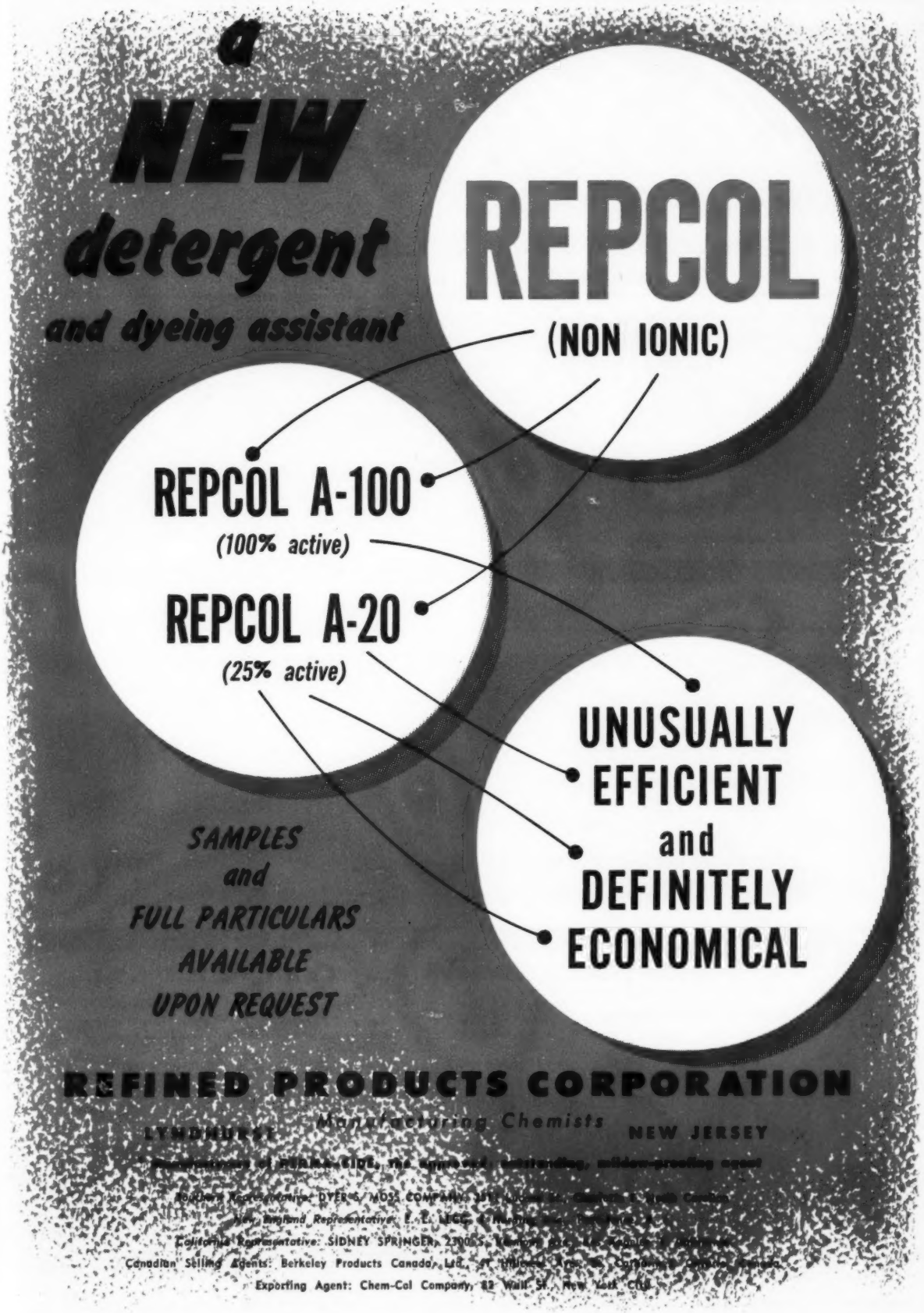
IN CANADA: SCHOLLER BROTHERS, LTD., ST. CATHARINES, ONTARIO

Write today for full details on the Scholler Wool Shrinkage Control Process — SCHOLLERIZE applied to your wool product . . .

Schollerized WASHABLE WOOL SAFE TO TUB • SAFE TO RUB

MANUFACTURERS OF SOAPS, SOFTENERS, SULPHONATED OILS and FINISHES

• SERVING THE TEXTILE INDUSTRY SINCE 1907 •


a
NEW
detergent
and dyeing assistant
REPCOL
(NON IONIC)
REPCOL A-100
(100% active)
REPCOL A-20
(25% active)
UNUSUALLY
EFFICIENT
and
DEFINITELY
ECONOMICAL
SAMPLES
and
FULL PARTICULARS
AVAILABLE
UPON REQUEST
REFINED PRODUCTS CORPORATION
Manufacturing Chemists
LYNDHURST
NEW JERSEY
Canadian Selling Agents: Berkeley Products Canada, Ltd.
Exporting Agent: Chem-Col Company, 82 Wall St. New York City

We Recommend the use of

CATYLON

Cation-Active Softener

- For that velvety, smooth softness
- For that permanent, uniform finish
- For that richer, fuller hand
- For those bright shades & print colors

THE HART PRODUCTS CORPORATION, 1440 BROADWAY, NEW YORK 18, N. Y.

Hartex Products:

Rayon Oils & Sizes
Nylon Oils & Sizes
Kier Bleaching Oils
Finishing Oils
Synthetic Detergents
Conditioning Agents
Scrooping Agents
Splashproof Compounds
Delustrants
Leveling Agents
Cationic Softeners
Cotton Warp Dressings
Wetting-Out Agents
Weighting Agents
Mercerizing Penetrants

Hart Products

based on research

AMERICAN

DYESTUFF REPORTER

NORMAN A. JOHNSON
Editor

CHARLES A. WHITEHEAD
Managing Editor

MYRON D. REESER
Advertising Manager

HERBERT A. STAUDERMAN
Advertising Representative

GRACE B. BURTON
Production Manager

M. H. MORGAN
Circulation Manager

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

•

American Dyestuff Reporter was founded in 1917 and the Textile Colorist and Converter (formerly Textile Colorist) was incorporated with it in January, 1949. Published every other Monday by the **HOWES PUBLISHING COMPANY, INC., One Madison Avenue, New York 10, N. Y. C. R. Howes,** President; **Harry F. Crawford,** Executive Vice-President; **Norman A. Johnson,** Vice-President; **Ernest J. Finan,** Treasurer; **Myron D. Reeser,** Secretary; **C. Essenbreis,** Assistant Secretary.

•

Also Publishers of
HOSIERY INDUSTRY WEEKLY
HOSIERY MERCHANDISING

•

FEBRUARY 20, 1950
VOLUME 39 NUMBER 4

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library

• Special Articles

Current Activities of the Inter-Society Color Council 109
E. I. Stearns

The Vat Acid Applied to Dyeing..... 113
Dr. Joachim Mueller

Different Phases of Naphthol Dyeing..... 117
Bert Celentano

• Departments

Book Reviews 119

Abstracts 133

Trade Notes--New Products..... 137

• Proceedings of the American Association of Textile Chemists and Colorists

Noncellulosic Group:
The Occurrence of Soluble Wool-Substance as a Result of the Sulfuric Acid Carbonizing Process P122
Jackson Bauer

Employment Register P128

Moisture Determinations in Wool.....P129

Calendar P129

February 14th Dinner Meeting, Rhode Island Section P129

Borrick, Pfannmuller Speak at R. I. Section Meeting.P130

Philadelphia Section Meeting Report.....P130

Report of Piedmont Winter Meeting.....P130

Northern New England March Meeting.....P130

Report of Western New England Section Meeting.P130

Membership Applications P131

S. E. Section to Meet Feb. 25.....P131

Copyright, 1950, Howes Publishing Co., Inc.

FOR DE-SIZING

RAPIDASE®

Heat-stabilized amylolytic enzyme preparation, liquid. Solubilizes starch sizing in cotton, rayons and mixed goods . . . at extremely high temperatures. *De-size faster at lower cost with Rapidase.*

RAPIDASE-M Intermediate strength—with all the characteristics, quality and value of Rapidase. For those who prefer a de-sizing agent of higher concentration.

RAPIDASE-CONCENTRATED For those whose needs demand a de-sizing preparation of highest unit strength. Because of its high concentration, greater economy is obtained in freight handling and storage expense.

ZYMEX®

A powdered amylolytic enzyme preparation in high concentration. For those who prefer the convenience of a powdered enzyme . . . with all the advantages and economy of Rapidase.

SERIZYME®

Proteolytic type liquid de-sizing agent. For de-sizing fabrics containing gelatin, casein, soya and other protein and albuminous sizes. Produces a finer, softer hand, more uniform quality, clearer cross dyes.

In conjunction with any enzyme preparation . . . SACON . . . a non-ionic wetting agent and detergent. It is compatible with enzymes and is applicable in neutral, acid or alcoholic solutions.

Our technicians are available to visit your plant on request . . . Write for booklet.

WALLERSTEIN COMPANY, INC. 180 MADISON AVENUE, NEW YORK 16, N. Y.

AMERICAN
DYESTUFF REPORTER

VOLUME 39 FEBRUARY 20, 1950 NUMBER 4

CURRENT ACTIVITIES OF THE INTER-SOCIETY COLOR COUNCIL*

E. I. STEARNS[1]

Calco Chemical Division, American Cyanamid Co.

Introduction

THE aims and purposes of the Inter-Society Color Council are to stimulate and coordinate the work being done by the various societies, organizations, and associations leading to the standardization, description, and specification of color and to promote the practical application of these results to the color problems arising in science, art, and industry.

Organization and Membership

As its name implies, it is not an independent society. The question has often been raised as to why the Council did not establish itself originally as an independent organization. In 1931, when the problem arose of having a standard set of color names for use in the U. S. Pharmacopoeia, the founders of the Council believed that the interests of color could be better advanced by a council made up of delegates from existing societies interested in color than it could by the establishment of a new society or association. Consequently, the Articles of Organization and Procedure of the Council, which were prepared in large part by L. A. Jones and M. Rea Paul, were deliberately written to coordinate the color interests of established societies; they thus exclude the possibility of the Council being a separate organization. No Executive Committee of the Council has since seen any reason to change this status.

Provision was made, however, for individual members, of which there are now 185 in the I.S.C.C. The purpose of these memberships is to provide contacts with the color activities of other individuals and organizations for persons who are not connected with a member body. The I.S.C.C. does not seek additional individual members, but it is glad to consider acceptance of qualified persons who voluntarily apply for membership.

Any organization not operating for profit that is national in scope is eligible for membership. At present there are 19 such member bodies as follows:

American Artists Professional League.
American Association of Textile Chemists and Colorists.
American Ceramic Society.
*The American Designers' Institute.
*American Institute of Architects.
*American Institute of Decorators.
American Oil Chemists' Society.
American Pharmaceutical Association, National Formulary.
American Psychological Association.
American Society for Testing Materials.
Federation of Paint and Varnish Production Clubs.
Illuminating Engineering Society.
National Association of Printing Ink Makers.
Optical Society of America.
*Society of Industrial Designers.
Society of Motion Picture Engineers.
Technical Association of the Pulp and Paper Industry.
The Textile Color Card Association of the United States, Inc.
U. S. Pharmacopoeial Convention.

The last four associations to join are starred in the above list. It is interesting to note that whereas the aims and purposes of the Council have always been to embrace problems in science, art and industry, the earlier members primarily represented science and industry, whereas the four new members are to a large extent concerned with art. The Council is, therefore, particularly happy to have these four new memberships and thereby round out its representation. The Council can best be described as a "Committee of the Whole" of all color interests in the member bodies of which it is composed.

Meetings and Publications

One consequence of not being a society is that it does not have many independent meetings and independent publications. Usually only one meeting a year is held on an independent basis. This often consists of a business meeting, a discussion or technical session, and a popular session. Technical sessions summarize results of studies on a single phase of color, but it is not their purpose to provide a place for presentation of new material; research material usually should be reported to the appropriate member body. Similarly, the purpose of the popular and discussion sessions is not to present new data or report new studies except as they concern discussion or presentation of committee reports.

The independent reports are also rather limited in number. There is a *News Letter* which is published bi-monthly for the purpose of disseminating news items about the Council and about color activities in general; there are minutes of the annual meeting, and such reports of specially appointed committees as are more suitable for publication by the Council itself than by any single member body. Whenever suitable, committee reports are published by the member bodies.

* The substance of a paper presented on September 28 by Dr. Stearns in London to a meeting of the Colour Group of the Physical Society.

[1] Counsellor of the Inter-Society Color Council; chairman of A.A.T.C.C. delegates to the I.S.C.C.

In line with the purpose of stimulating and coordinating color work being done by various societies, the I.S.C.C. frequently holds technical sessions jointly with individual member bodies. The Council assists in arranging the programs and inviting suitable speakers, but it is the individual member body which publishes these technical session papers in their journals. During the history of the Council there have been over 70 papers published as a result of this kind of meeting. These meetings are one of the Council's major activities, and provide a proper place for summarizing work that may already be well known in one field, but should be made better known in another. The result of any new color studies that may be presented in the course of such sessions are included merely because they properly relate to the general subject. Ordinarily, reprints of the technical sessions are made available to all delegates and members of the Council in line with its object of coordinating the work being done by the various societies. Some of the special committee reports are also published on this basis (i.e., in the journal of an individual member body) although a few committee reports (e.g., *The Color Terms Report)* are published by the Council directly.

The Council stands ready at all times to receive problems pertaining to color, particularly when they are brought to its attention by member body representatives. When a color problem is received, it is disposed of in one of three ways. Some problems can be referred immediately to a recognized authority who may already have the solution. Problems which seem to be limited to the interest of a particular society are referred to that Society. Problems which appear to warrant special study are referred to a committee especially formed for that purpose.

Members of the Council are so widely scattered geographically that it is not practical to hold many general sessions. The Council has therefore encouraged the development of local color groups, which meet several times each year. There are at least five such local organizations in the United States specifically interested in the subject of color. These are the Washington-Baltimore Colorists, the Boston Color Group, the New York Color Associates, the California Color ociety, and the Philadelphia-Wilmington Color Group. For a few years there was a group in Chicago. While there is no formal association of these groups with the Council, their formation and meetings have been encouraged through giving them regular publicity in the News Letter and supplying bulk copies of the News Letter to such groups as wish them. Individuals in each group are usually connected with the Council as delegates or through individual membership.

Problem Committee Activities

The current technical activities in color, particularly those including new research work, are to be found in the activities of the various committees.

Problem No. 6, "color terms", has been under the chairmanship of Dr. Sidney M. Newhall. This committee put out a report in January 1949 of a comparative list of color terms. Included in this are the terms used by the Colour Group of the Physical Society as put out in its 1948 report on color terminology. In this comparative list if you look up the word "saturation", you will find six separate definitions. In one sense this comparative list of color terms is complete. If a particular color term is used in a publication of a particular member body, you can refer to this list and know what is meant by the term. In another sense, however, this work has only started. Five definitions of saturation from the I.S.C.C. member bodies appear to be alike. It would be desirable to have all five member bodies agree upon a single definition. If such agreement could be reached for this and other words, the length of this color terms report could be greatly reduced and its usefulness increased.

I think the next step for this Committee of the I.S.C.C. is to go through the list of color terms and star certain definitions which could be called recommended definitions. The representatives of each member body might consider its official definition and the recommended definition, and if no significant difference is found they could approve the recommended definition for their member body and strike out the older one which meant essentially the same thing.

If a particular member body did not accept the "universal" definition because it understood the term to mean something different, as is the case for the C.G.P.S. definition of saturation, then its definition would be listed in addition. The fact that two definitions were included would mean that there is a significant difference in the use of this particular word by certain of the member bodies. Right now it is impossible to tell whether there are five definitions because of accidental wording by each member body or because of intentional differentiation. An international acceptance of definition of terms would be helpful to anyone reading the foreign literature. With the work of such an I.S.C.C. committee, and the help of a committee of the Colour Group of the Physical Society to continue its work on Color Terms, international standardization may be a definite possibility.

Problem No. 7, "color specifications", under the chairmanship of Walter C. Granville, is undertaking a survey of color specifications which have been adopted by various member groups.

Problem No. 10, "color aptitude test", is under the co-chairmanship of Forrest Lee Dimmick and Carl E. Foss. The first color aptitude test, the so-called 1940 Edition, has been described in the Journal of Applied Psychology, *30,* 10 (1946). A later edition, the 1944 Edition, has been described in the 1946 *Annual Report of the Inter-Society Color Council.* This color test consists of a duplicate set of color chips—one set is arranged on a matching field and the other is presented as loose chips. These loose chips, one at a time, are matched to the nearest one in the matching field. The present plan is to bring out a third edition which will be available for general sale and which will incorporate all of the improvements indicated as desirable by the first test. The production of a final edition is proceeding slowly, partly because of lack of funds. The first thing necessary, the colored chips, are being worked on currently by Carl E. Foss. After the chips are completed, the sets will have to be "verified", that is, tests will have to be carried out with a number of observers and plotted so as to determine what score signifies an exceptional rating, what score signifies an acceptable rating for normal color matching work and any further ratings that are desired. This verification will take additional time after the chips have been prepared. The preparation of the chips and the verification of the tests without sufficient funds for active work may delay the public offering of a final edition of this color aptitude test for some time.

One is reminded by Problem No. 10 of the British Book by W. O'D. Pierce *"The Selection of Colour Workers"* (1934). It is understood that Mr. Pierce, an individual member of the ISCC, and now located in the United States, expects to go ahead with a color aptitude test on his own accord, but this is entirely independent of any action of the ISCC.

Problem 11 was on "color blindness". The last work of this committee, before it asked to be dismissed, was approval of 18 selected charts of the American Optical Company pseudo-isochromatic plates as a test for color blindness. This selection is in accord with a report in the *Journal of the Optical Society of America, 36,* 610 (1946) by Hardy, Rand and Rittler. It can be reported that this team is working independently on the production of an improved test that, among other things, will be diagnostic.

Problem 13, "the illuminant in textile color matching" was under the chairmanship of Miss Dorothy Nickerson and the subcommittee was dissolved subsequent to publication of its full report in *Illuminating Engineering, XLIII,* 416 (1948) and a

VERY PALE	VERY LIGHT	BRILLIANT	VIVID
PALE	LIGHT		
GRAYISH	MODERATE	STRONG	
DARK GRAYISH	DARK	DEEP	
BLACKISH	VERY DARK	VERY DEEP	

Figure 1

summary report in the *Journal of the Optical Society of America, 38,* 458 (1948).

Problem 14, "The study of transparent standards using single number specifications" has just started under the chairmanship of Robert H. Osborn. This committee plans to evaluate colorimetrically and put on an absolute basis the various transparent standards used for single number specifications so that they may be inter-compared and standardized. It is studying such standards as the Fat Analysis Committee standards, Gardner Standards, Hazen standards, etc.

Color Names

Problem 2. "Color Names", under the chairmanship of Dr. D. B. Judd was undertaken in an effort to provide a method of designating colors which would be (a) standardized sufficiently to be acceptable to science; (b) all inclusive so that it could be used by any art and industry; and (c) understandable by the whole public. The work of an early committee on Problem 2 was reported in the *Journal of Research of the National Bureau of Standards, 23,* 355 (1939), and has come into use under the title of "ISCC-NBS" color designations. For the purpose intended, the scheme has worked very well but, as expected, the necessity for minor revisions began to develop when an effort was made to apply this system to widely different fields. Revisions of this sort have been made this year and are now being incorporated in a report by Judd and Kelly for publication as a research paper of the National Bureau of Standards, replacing the original NBS report, RP 1239, (1939).

It is believed that industries which cover a fairly complete range of colors, and do not have earlier prejudices, may use this system in its entirety to supply descriptive color names, even when they also use other and more fanciful names for sales purposes. Of course, in industries or sciences that deal with restricted color ranges such names do not provide a wide enough coverage. For instance, there may be a particular color which the textile colorist who deals with the whole range of colors knows as a "brown". The wood stain technologist, who deals with a restricted range, might call the same color "mahogany". The soil scientist might call it "red". The ISCC-NBS name of the color might be "moderate reddish brown". The soil and wood men know that their colors are browns, but they have so many of them that they must differentiate. The whole usage of color, however, would be rendered more understandable if each color user would refer alternately, or in explanation, to the ISCC-NBS system. The limits of "moderate reddish brown" are scientifically established by the ISCC-NBS method yet the name is descriptive and understandable to all classes of people even though, within specific industries, it might be described by another term.

The ISCC-NBS method is simple in principle. The terms, light, moderate, and dark designate degrees of lightness, the adjective "very" extends the scale to "very light" and "very dark". The adjectives grayish, moderate, strong and vivid designate increasing degrees of saturation. Combinations of lightness and saturation are indicated by the terms shown in Fig. 1.

Pink, red, orange, brown, yellow, olive, green, blue, violet, purple, and combinations of these terms provide 26 hue designations in the revised system. Used with certain of the above adjective designations, the system provides for 269 color names.

The importance of the system lies in the fact that the limits are specified for each color name. This, and the system itself, can be best understood by reference to the Munsell color solid. Each designation defines a block in the surface color solid, and there are 269 such blocks in this revision.

The system was built around the Munsell color solid for several reasons. The Munsell system is specified in terms of spectrophotometric measurement and I. C. I. data. It was originally set up to represent psychologically equally spaced divisions and, hence, the correlation with common color names was fairly simple. If, for instance, it had been attempted to set up such a system of color names on the basis of I. C. I. data, it would be necessary to assign different hue names along any plane of constant dominant wavelength but varying luminosity and purity. Even with the Munsell solid, it was occasionally necessary to use different common hue names to describe the colors given a constant hue designation by Munsell. For instance, in the plane of constant hue 7R, the hue names yellowish pink, reddish orange, red and reddish brown have been used to represent different areas. On some planes of constant dominant wavelength on the I. C. I. system, however, there would be even more hue names necessary.

An appendix to the revised Color Names Report will contain ISCC-NBS color designations for terms used in a number of segments of industry and science where names are well enough standardized.

Fig. 2* shows the 3P-9P Munsell planes from the new revision. This is a very straightforward example. The only hue name is purple and all 15 of the adjective modifiers which are ever used to edscribe a hue are used on this chart to describe the type of purple.

Fig. 3* shows a slightly more complicated chart in which there are two hue names, green and bluish green. This is for the Munsell planes 9G-8BG. However, here not all of the permissible adjective modifiers have been used. For instance, there is no color described as very deep bluish green. This is because it was thought that all of the colors could be satisfactorily described without the use of this term.

Fig. 4* shows planes 1Y-6Y. Here again there are two hue names involved—yellow and olive brown. Ten of the permissible adjectives have been used to describe the various kinds of yellow. Very dark yellow is not used because a color which was very dark yellow would be more commonly called light olive brown. Likewise, the term very light yellow is not used because yellow by itself is a light color and the implication of lightness is contained in the word yellow itself. It will be noted that light olive brown is generally a darker color than dark yellow. This is because olive brown connotes darkness whereas yellow connotes lightness. The adjective modifiers, therefore, are not placed rigidly along any particular Munsell value but the whole set of of adjective modifiers is slid up or down on the value scale depending upon the hue name which they are modifying.

Fig. 5* shows the revised chart for planes 4R-6R. There are three hue names, red, yellowish pink and pink. The distinction between red and pink is based largely on a difference in value and the 15 permissible adjectives apply to each group of colors to the extent necessary. The term light red is not used because light red means pink. A distinction is

* Figs. 2, 3, 4 and 5 are taken from Dr. Judd's report.

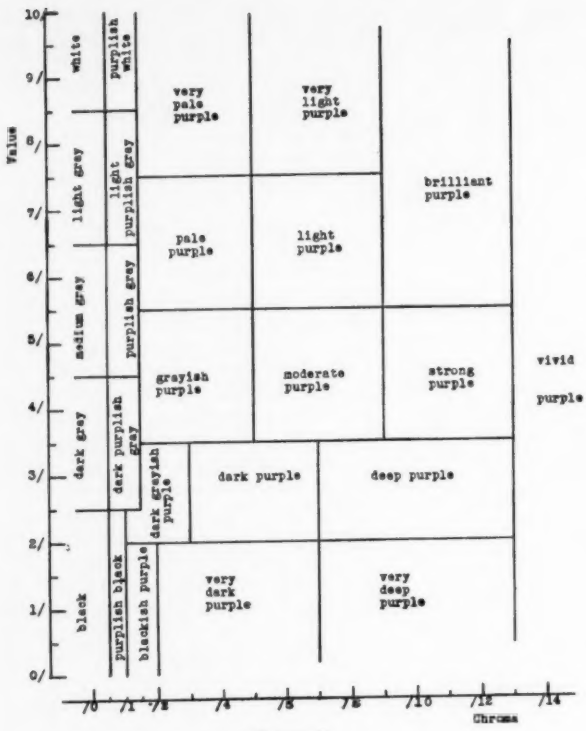


Figure 2

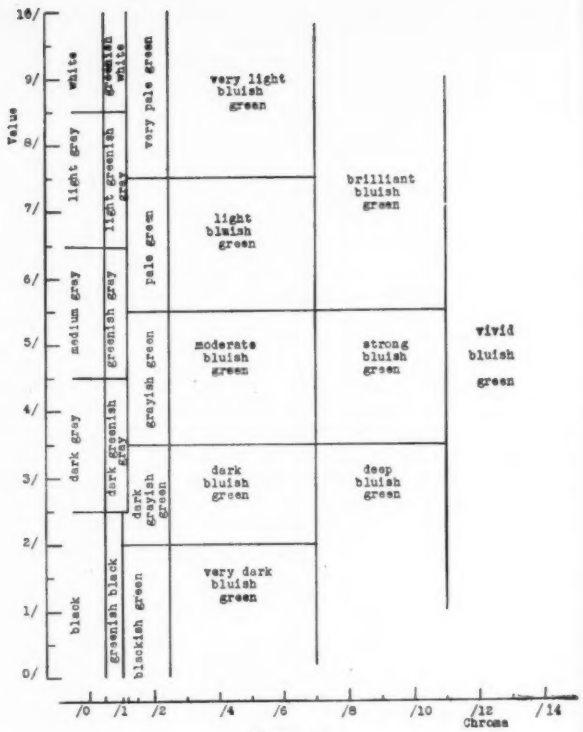


Figure 3

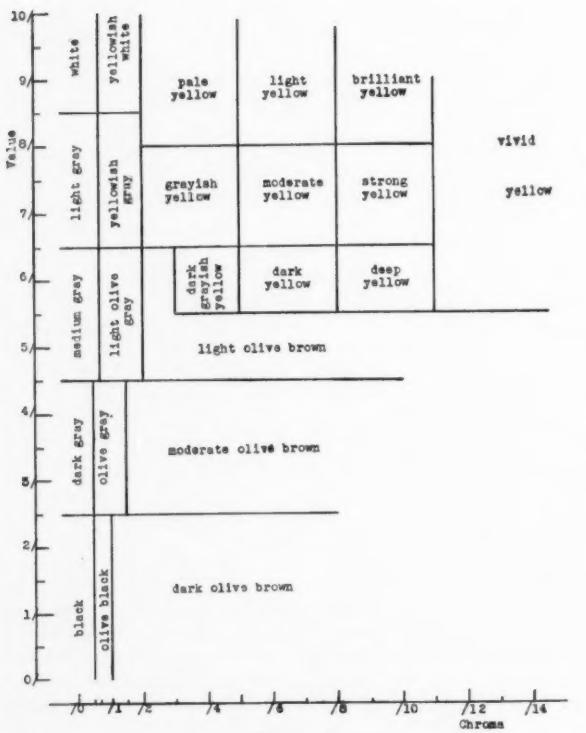


Figure 4

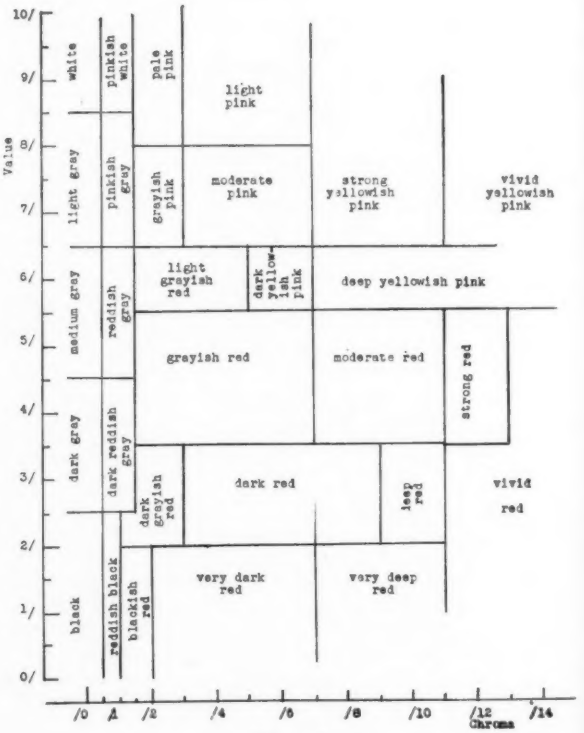


Figure 5

made between pink and yellowish pink even though the Munsell hue is intended to be constant. This may be a criticism of the representation of constant hue in the Munsell system in this region of the solid.

It should be emphasized that one chief point of departure of this system from other naming systems is that it presents

(Concluded on Page 120)

THE VAT ACID APPLIED TO DYEING*

DR. JOACHIM MUELLER
Krefeld, Germany

PRIOR to reporting on the application of the vat acid to dyeing, a few preliminary remarks are necessary. To begin with, the time chosen for this lecture is opportune, as developments have now reached a rather conclusive stage, when we are not only enabled, but also justified, in briefly reviewing the research work done from the outset. To prevent from the beginning any misunderstanding, let it be clearly stated that the author does not assert to have invented or discovered the vat acids. Claim is laid only to having recognized early enough their special practical value and to having investigated and worked out with intense energy and with some measure of success, various possibilities of their application. The practical value of the vat acid is emphasized in view of some remarks made in numerous English and American surveys of this subject, to the effect that technical advantages in the application of the vat acid could not be found. This matter will be referred to again later in this report. On the other hand, it must be unequivocally stated that by no means an application of the vat acid under all circumstances, without due criticism, is advocated; also not in such cases for which soluble vats are the most suitable applicable products, nor when the use of powder fine pigments suffices, instead of the vat acid, when highest demands for rapidity of development or penetrating power of the dyestuff are not made.

The entire chapter of constructive research work on the vat acid is an almost classical example of a laboratory test tube observation being consistently followed up and the effect observed made utilizable technically on work's scale. What gave occasion primarily to the first trials with the vat acids? The stock vat process had been introduced industrially and employed in textile works for the machine dyeing of staple fiber, the principle of this process being based on diluting concentrated stock vats with a neutral dyebath liquor, whereby an extensive hydrolysis of the sodium leuco compound to the free vat acid is brought about. Here difficulties or limitations of two kinds arose:

1) Not all sodium leuco compounds were hydrolyzed to a sufficient extent by dilution.

2) In several cases a more or less extensive conversion of the normal enol leuco compound into the corresponding keto form, inutilizable for dyeing, occurs because of working within a low caustic content range.

This gave rise to the idea of nullifying these defects by means of a complete neutralization. Initial trials showed that the free leuco compounds, with certain precautions ruling, can be obtained in the form of a colloidal solution. It is quite comprehensible that on observing these first test tube experiments one would be led to conceptions of excellent penetration of the dyestuff and, anticipating events, of continuous dyeing processes. Yet there was a long path to follow, indeed, far longer than at first assumed. An intense study of the properties of the vat acid itself, as well as the working out of recipes or formulas applicable on a factory scale were rendered necessary. To begin with, the dyestuffs did not all, by means of one rule-of-thumb recipe, oblige the investigators altogether as desired, in letting themselves be converted into stable vat acid preparations. Added to this were the multitudinous individual investigations necessary for setting up and working out the various phases of the processes for machine and piece goods dyeing, and, last but not least, the endeavors to attain appreciative recognition for the vat acid among inner and outer technical circles.

The most important property of the vat acids, their capability of forming colloidal solutions or very finely divided suspensions, has already been mentioned. Of almost equal importance is the fact that they are, contrary to the sodium leuco compounds, practically without affinity for the fiber. Thereby material can be treated with the vat acid without any inconvenient disadvantages occurring, as are unavoidable with dyestuff solutions possessing affinity. In this respect, for instance, we need only refer to the irregular alteration or change in percentage composition of padding liquors, or to the exhaustion of dyestuff liquors in the outer and inner layers of wound up goods. Another factor of importance, furthering the development of these researches, was the fact that the conversion of the vat acid into the alkali leuco compound took place instantaneously. Upon this depend to a considerable extent, the effects obtainable with the vat acid in piece goods dyeing, both in the vat acid padding method modification of the well known foulard jigger combination and in the vat acid continuous process. For piece goods dyeing it is also of significance that the state of fine division of the vat acid does not alter even during oxidation, which takes place in the intermediate drying of vat acid padded goods. When comparing (for example in the case of Indanthrene Red Brown GR) equal concentrations of the vat acid and the pigment, the substantially fuller body and brilliancy in shade of the oxidized vat acid padded goods clearly point to the much finer state of division of the dyestuff in the vat acid form. However, there is actually no true dyeing here as can be seen by a washing test. For the fixation of the dyestuff on to the substrata the presence of alkali is essential.

When dealing with vat acids, it is at first somewhat surprising to see frequently the great divergence in shade of color between the vat acid and the sodium leuco compound; this is particularly characteristic in Indanthrene Brilliant Green brands and their combinations. In the majority of cases however, the differences are not so great. Thus, for instance, the vat acid of Indanthrene Blue RSN is violet and the color of the vat is blue. With Indanthrene Blue BC a similar difference is thereby lessened in that the vat acid solution is only to a certain extent redder than the vat itself. Finally, in the case of Indanthrene Brown 3GT there is no difference in color shade to speak of. Here for the experienced observer the transition into the vat acid form is recognizable

* Lecture delivered at the Session of Textile Chemists and Colorists in Badenweiler, Germany, on April 8th, 1949 and published in "Melliand Textilberichte", August, 1949. The author developed the vat acid processes, here described, while he was on the staff of the I. G. Farbenindustrie in Ludwigshafen.

only by the peculiar "dead" appearance assumed by the solution at that moment, that is, loss of color intensity.

This discourse on the properties of the vat acids may be concluded with a reference to the circumstance that the aforementioned enol-keto transposition can also take place in the vat acid under certain conditions, especially in the case of the Indanthrene Blue group of dyestuffs, that is, in the case of real derivatives of Indanthron.

This fact was the reason for recommending the additional use of Igepon T in preparing the vat acid of Indanthrene Blue BC. Without this addition both in machine as well as in piece goods dyeing there would be considerable loss in coloring strength due to the characteristic property of the keto form, namely, on the one hand being like the vat acids, without affinity, but on the other hand, contrary to the vat acids, not being transformable again, or only with great difficulty, into the normal sodium leuco compound. In the color department laboratory of the I.G. in Ludwigshafen I carried out very intensive researches in this matter, on which I have reported in two publications in the March and April 1947 numbers of *Melliand's Textile Reports*, so that it is unnecessary here to enter further into this most interesting subject.

When subsequently dealing with the various vat acid processes only the most essential points will be considered, without going too far into details. As the processes themselves are well known, the question is only to point out the characteristics of the different variations derived from the one fundamental principle. A detailed study of the vat acid padding method will appear shortly on another occasion.

Vat Acid Process for Machine Dyeing

This process was developed out of the special provisions resulting from the machine dyeing of staple fiber. As a decisive factor, mention may be made of the swelling of regenerated cellulose and, connected herewith, the difficulties of dyeing through. As aforementioned, certain limitations inherent to the stock vat process gave impulse to these studies.

Compared with circumstances in piece goods dyeing in discontinuous and likewise in continuous operations, we have before us in this case, however, a distinct special development. In piece goods dyeing only such methods, in which the vat acid is applied to the material by a padding process and only that dyestuff present on the material itself is fixed by a developing process, gave results of practical worth. In machine dyeing the vat acid present is far more diluted because all the dyestuff to be fixed on the fiber afterwards is distributed throughout the dye liquor.

With ratios of goods to liquor from about 1:10 up to a maximum of 1:20-1:25 the difference is evident. So, when the vat acid liquor circulates through the wound or packed goods, only a fraction of the dyestuff, in the form of vat acid, is present on the goods to be dyed at that moment of bringing about the conversion into the sodium leuco compound. If then all the alkali were to be added at once, there would be hardly any advantage gained over the use of the direct vat. It was therefore necessary to maintain a gradual conversion. This can be achieved by gradual additions of caustic soda and hydrosulfite, the latter to prevent premature oxidation, or by feeding a slow flow of caustic soda hydrosulfite solution.

The process was found to work very well after several initial difficulties were overcome, for which I have to thank Ellner of Stuttgart, Germany, for his excellent collaboration. The process is still of benefit when the material to be dyed presents special difficulties due to great compactness or quantity, or, as with Cuprama, when the affinity of the regenerated cellulose is very high. In numerous cases simpler methods can be employed; of these may be mentioned, besides the stock vat process, the pigment process and the widely used graduated temperature process.

Vat Acid Padding Method Employing Foulard and Jigger

At the very beginning of these trials, when the colloidal solution of Indanthrene Blue RSN vat acid was observed and the instantaneous conversion into the sodium leuco compound was determined, the first thought to occur was that an ingenious way of fixing the dyestuff by padding with the vat acid and after treating with caustic soda should be feasible. By this means a continuous process of dyeing Indanthrene seemed to be within reach. Unfortunately the circumstances were by no means so simple. In absence of hydrosulfite, the oxidation immediately setting in was indeed much speedier than the rate of fixation of the sodium leuco compound. The recognition of this fact was a bitter disappointment and, first of all, necessitated modifying old methods to render them applicable for the vat acid. So experiments dealing with the vat acid padding method were initiated, corresponding in working principle with the well known pigment padding method. The first experiments gave good results with regard to accelerated speed of absorption and in respect of level dyeing, thus encouraging the undertaking of further research. Here new problems concerning the setting up of stable vat acid preparations had to be solved, entirely different to the very diluted solutions in machine dyeing. It is quite clear that those familiar with the chemism of vat dyestuffs but who have not themselves actively partaken and gone through the entire development of this research must, at the uneasy thought of possible difficulties arising, feel dubious about ever arriving at a reliable method of application. This is often found to be the case, as it is with the English and American reviewers and revisers of the vat acid process. Fargher, for example, states in an article "Comparison of Dyeing Methods in Germany and in the United States" in the December 1947 issue of the *Journal of the Society of Dyers and Colourists*, that in the opinion of American circles it will be difficult in higher concentrations to obtain stable dispersions. On the other hand, the well known reports of the Piedmont Section of May 1947 and afterwards J. H. Hennessey in the *American Dyestuff Reporter* express a more definite view, because these reviewers were, after all, impressed by the advantage of better levelness and penetration. It is by no means intended to enforce enlightenment upon American and English colleagues with regard to the vat acid process, wherefore it will suffice merely to state that a thorough study and working over of the Indanthrene assortment led to success in definitely classifying every one of these dyestuffs, either as suitable or unsuitable. That is to say that there are, of course, dyestuffs like Indanthrene Blue 5G, which proved to be unsuitable, but on the other hand we are entirely certain of the applicability of those dyestuffs ascertained to be suitable.

It was finally found possible also to set up the rule-of-thumb recipe referred to above. With regard to this the fact must be mentioned, that for the vat acid preparations other dispersing agents have to be used than those for the stock vat process, where the complete dyebath is still alkaline. Here on the contrary, for the transition from the alkaline to the neutral or acid stage, specifically efficient dispersing agents had to be found. By far the best for this purpose proved to be a condensation product of beta naphthalene sulfonic acid and formaldehyde.

For weaker concentrations almost all Indanthrene dystuffs are suitable. Thus, the few exceptions are confined to the naphthalene tetracarbon acid dyestuff, Indanthrene Brilliant Orange GR and Indanthrene Scarlet GG, whereas contrary thereto, the perylon tetracarbon acid derivatives, Indanthrene Scarlet R and Indanthrene Red GG, present no difficulties

whatsoever. The Indanthrene Blue dyestuffs, in as far as they are derived from Indanthron itself here also as in other spheres of application, exhibit their peculiarities. For example, those that can be said to be suitable for this process, require an addition of Peregal. On the other hand, for Indanthrene Blue BC, Peregal cannot be used because of the enol-keto transposition. Indanthrene Blue 5G and the chemically appertaining Indanthrene Green BB are completely excluded.

In higher concentrations naturally some further limitations arise; thus for example, the various acridone and a few Indanthrene Blue brands are unsuitable. However, the general principle is not essentially altered thereby.

There is only a very limited choice possible of dispersing agents necessary for vat acid prepares that are really suitable for the purpose. The aforementioned condensation product of beta naphthalene sulfonic acid and formaldehyde exhibit surpassing efficiency and can only partially be replaced by sulfite cellulose waste liquor products. One proceeds in practice by stirring stock vats, containing these additions but of otherwise normal composition, into a diluted solution of acetic acid or formic acid. The mixing together must take place instantaneously, this being a matter of utmost importance practically. The critical phase is only precedent to the neutralization itself. If the vat acid is once obtained in the desired fine state of division, then the stability of the prepares is excellent.

The special advantages of the vat acid process can be summed up as follows: first of all, numerous observations show that the vat acid liquors penetrate better than the corresponding pigment prepares, so that the number of passages on the foulard can be reduced, and besides, improvements in dyeing through are attained. But the most striking advantage is, on the one hand, accelerated speed of development, and on the other hand, the improvement in level dyeing. In the case of mixed fibers, the cotton and the staple fiber or viscose often proved to be better dyed tone-in-tone. These investigative researches which ensured a perfect manipulation of the vat acid, opened the way for working out actually utilizable continuous methods.

Vat Acid Continuous Processes

The principal theme, the vat acid continuous method on the Electro-Fixer, will be preceded by a survey of other continuous dyeing possibilities. Here we can distinguish between two types of methods as concerned with fast dyeings:

1. Methods in which the dyeing components possess no affinity, or at the most only up to medium affinity.
   To these belong the soluble vats and the Naphthol AS combinations.
2. Methods in which dyestuffs in a form possessing high affinity are employed.
   Vat padding methods.
   Indanthrene Blue continuous dyeing vat (roller vat).

Confining myself once more to the vat colors and soluble vats, method 1 gives excellent results in quality of the dyeings, and the method is also simple in procedure. Soluble vats are limited with regard to depth of shade and by the fact that the assortment of brands on the market is not complete enough to enable the dyer to produce an entire range of shades of equal high degree of fastness.

With the methods of the second group, dyeings of high quality cannot be obtained because leveling and penetration leave much to be desired on account of the high affinity of the dyeing liquors. Furthermore, when using dyestuff combinations, difficulties arise through difference in affinity of the components.

As it did not prove worth while simply to supplement methods in use with a new variation, the question from the outset was to work out a method in which the dyeing results achieved could be placed side by side with those of the soluble vat continuous process. The extent to which vat acid conformed to these conditions was described in the discourse on the vat acid padding process. To complete the subject of working requirements concerning the dyestuff, it was necessary only to search for suitable thickening media, because an intermediate drying of the vat acid pads proved to be more advantageous for natural celluloses, and even essential for regenerated celluloses. By far the best results here were achieved with British gum, that is, burnt Indian corn starch or maize starch. Dextrine made of potato starch, tragacanth and cellulose ether of various kinds were found to be unsuitable. Among plastics, the most suitable were those products of the type of semi-saponified polyacrylnitrils. For bringing these continuous dyeing projects to complete realization the way was opened by the well known Electro-Fixer of Dr. Aubauer, Vienna. This consists actually of nothing else more than a box closed in on all sides, having an opening for entrance and another for exit of the goods, equipped with the necessary number of guide rollers for several horizontal runs of the goods. At the front side and on the ceiling of the apparatus electric heating units or radiators are arranged so that the moist goods entering from the forerunning padding machine are instantaneously heated up to 100°C. without, however, the goods being thereby completely dried or dessicated. Both of these factors, namely, instantaneous heating up and attaining 100°C., are of decisive importance so that this matter will be taken up again later in this lecture when discussing the comparison with other possibilities of continuous dyeing. It is also necessary to say a few words about the pre-history and the primary sphere of application of the Electro-Fixer, in order to render what follows quite comprehensible. The Colloresin printing process for vat dyestuffs was brought out by the I.G. as a special method, without claiming it to be of general use. In this process the vat dyestuffs, without any addition except a thickening medium that coagulates with alkali, are printed onto the material. After drying, the printed goods are passed through a bath containing caustic soda and hydrosulfite, and thereupon immediately developed in a steam box, the so-called Colloresin steamer. Certain difficulties, in regard to uniformity of the prints, Dr. Aubauer reasoned to be due to premature decomposition of the hydrosulfite and also to insufficient transmission of heat to the goods from the steam. He arrived at the conclusion to replace the heating with steam by radiant heat of electric heaters. Thus the first Electro-Fixer was evolved in a small mechanical workshop in Vienna. The results produced by this apparatus with the Colloresin printing process were convincing. Many million yards have been processed in this way by the United Dyers Ltd. in Vienna-Moellersdorf and in some other places. The Electro-Fixer was of especial interest to me for reason that the Colloresin printing process is essentially a distinctly localized dyeing process. Here, contrary to the potash Rongalite printing process, we have all the usual dyeing precepts, namely, working with caustic soda and hydrosulfite. So, that what is regionally possible must also by a suitable modification of the conditions be rendered possible for the entire surface of the material. In connection with this, two considerations seemed to be specially noteworthy.

1) The use of a specific thickening. Colloresin DK fulfilled the conditions for printing, coagulating with alkali and thereby holding fast the dyestuff on the spot.

Apart from Colloresin DK being unsuitable for vat acid prepares, it appeared to be necessary to employ a thickening capable of producing just the contrary effect, namely, which would bring about a distribution of the dyestuff instead of holding it down to the spot where it was deposited.

2) For the Colloresin printing process with the Electro-Fixer both the pow-

der fine brands and even the ordinary powder brands could be used without disadvantage, as any defects in leveling practically did not show up in the comparatively small colored parts of a print.

As the intention is to produce dyeings in a continuous manner that would have to satisfy highest requirements of quality, however, the potentialities of the Electro-Fixer meet the possibilities presented by use of the vat acid to solve the problem.

The course of the process is, in short, as follows:

The well prepared goods are padded on a three- or four-roller padding machine with the thickened vat acid liquor and at once intermediately dried; for this a hot air drying machine proved to be best, but an automatic suspension drying machine or a full-width dryer are also quite suitable. Hot air tentering machines are not always so satisfactory. A pin tenter sometimes worked satisfactorily, but on other occasions tiny light halos were formed around the imprints of the pins. The clamp tenter is to be rejected on account of markings caused by the grips. Also, drum drying had better be excluded, as this drying method can only be employed if raising the temperature on the first drum or cylinder can be done slowly. Besides, there must be absolute certainty of a straight, creaseless run of the fabric. Any carelessness during drum drying will cause piled up or accumulative aspects of the prints, while pinched creases produce defects of their own. It must be emphasized: ***The condition of the goods after padding and intermediate drying predetermines the final result; if the goods are then in a satisfactory state, so will be the finished dyeings when aftertreated, provided that the developing in the Electro-Fixer has been carried out properly.*** It is superfluous to extend this dyeing method into a continuous process to the last detail. For reasons of space, or for other appropriate reasons, the continuity will have to be interrupted after intermediate drying, which is possible because the goods in this state can be left for any length of time. An ordinary two-roller padding machine, with rollers in horizontal position, is good enough for impregnating with caustic soda and hydrosulfite. This is of importance for dyeing because, thereby, the liquor takes effect equally upon both the upper and under side of the cloth. This is of still greater importance in the production of printed goods, to prevent blurring of the prints. The squeezing-off effect should be comparatively low for dyeings, namely, 150-170%, so that sufficient liquid remains in the fabric for the developing process in the Electro-Fixer. The rapid heating up to 100°C. is just as important as the prevention of any premature drying or dessicating of the goods. This latter object could for a long time not be fully achieved, resulting every time in a corresponding decrease in tinctorial strength, until finally, the supply of moisture (by the goods) and the action of heat were carefully attuned and adjusted to each other.

The length of stay of the goods in the Electro-Fixer is on an average 45 seconds. The goods leave the Electro-Fixer perfectly reduced throughout. A pre-oxidation air passage of considerable length is given, thereupon oxidation and aftertreatment are carried out on an open-width washing machine in the usual manner.

A few words remain to be said about the necessity of intermediate drying, and also, about the significance of the joint use of a thickening medium. Theoretically it seems, when working with a high squeezing-off effect of 60-80% on the color padding machine, that the aforementioned 150-170% squeezing-off effect on the foulard, pre-coupled to the Electro-Fixer, ought to ensure a plentiful enough supply of caustic soda and hydrosulfite for converting the vat acid into the sodium leuco compound and for fixing the dyestuff on to the material. Extensive trials on an Electro-Fixer model with goods of 40 cm. width, carried out in Ludwigshafen, showed that such a method of working also would be possible in the case of natural celluloses, although there is every justification for assuming that in this way dyeings of the same superlative quality are not obtained. This matter will be taken up again when discussing the effect of thickening. It is, however, quite impossible to do without the intermediate drying in the case of regenerated celluloses because of the strong swelling up of this material, as occurring during padding on the color-foulard which prevents, however high the squeezing-off effect may be, the caustic soda hydrosulfite padding liquor from penetrating into the material. The second padding liquor apparently seem to flow vainly back and forth over the goods. Peculiarly cloudy, but anyhow useless, dyeings are produced.

The use of British gum as a thickening medium is by no means only for the purpose of preventing migration of the vat acid on the fabric during intermediate drying; it has also a decided leveling effect, in such way that the aspect of the pads appears remarkably more solid and smooth than without the use of a thickening agent. Without a thickening agent every little variation in tension or every other mechanical irregularity in the fabric appears to be emphasized. This has been repeatedly confirmed to be so by comparative trials on various materials.

The development of this method completely into a factory working process was carried out in 1938-1944, much delayed by war conditions. The final certain proof for its practicability was rendered by a 40,000 meter programme, in the execution of which the former Reichsvereinigung Textilveredlung (National Union of Textile Processing) closely participated.

There now remains to be discussed, to what extent the method here described is solely confined to the use of vat acid, and furthermore, what limitations, if any, in regard to depth of shade obtainable, must be reckoned with. In answer thereto it can be stated: the developing efficiency of the Electro-Fixer is such that pads with powder fine pigments are also fully developed. Yet it would be well worth while if the dyestuff factories were to strive for further improvement in the fineness of division of these dispersed powder forms. The vat acid will be given continued preference, however, whenever best leveling and penetration are aimed at. There are practically no limitations with regard to depth of shade; even heavy dark blues could be fully developed.

Now, concerning the other possibilities open to us for continuous dyeing, it must be stated beforehand that every one of the processes yet to be discussed is practicable in its way, but for reasons connected with the developing energy employed, *cannot* be so universally applicable as the method of working with the Electro-Fixer. More precisely, the Electro-Fixer may not be said to be the only possibility, but an apparatus of equal developing efficiency is necessary. On what does it depend? It was not stated by chance, that it appears to be particularly important to attain a temperature of 100°C., and that as instantaneously as possible. There is a fundamental difference in working at 80°C. or at 100°C. Investigatory trials of many years proved that the fixation power of a dyestuff still mounts considerably between the temperatures of 80°C. and 100°C., without even considering the great acceleration in speed of reaction when reducing or re-reducing. Circumstances here are quite different to those when dyeing in dyebaths during a lengthy period of time and with a ratio of goods to liquor of 1:10 up to 1:30 or more, as the case may be. There, especially with dyestuff to be dyed in the cold or only warm, the final equilibrium adjusts itself more towards the dyestuff in the bath; whereas in the Electro-Fixer we have a ratio of goods to dye liquor—if it can be referred to as such—of 1:1½ and a dyeing period of only 45 seconds.

(Continued on Page 118)

DIFFERENT PHASES OF NAPHTHOL DYEING*

BERT CELENTANO

General Dyestuff Corporation

WHILE the method of dyeing naphthols will vary to some degree from mill to mill, there are, nevertheless, certain principal rules which must be followed so as to obtain consistency of shade and the desired fastness properties.

It is my purpose tonight to discuss the different methods of dyeing naphthols. However, before doing this, let us consider the various groups since the choice of the proper naphthol is important.

The naphthols can be divided into two groups, namely, the substantive and the nonsubstantive types. The former are those brands which have a greater affinity for the fiber and thus fix themselves sufficiently to permit salt rinsing after naphtholating and before coupling. The substantive naphthols are AS-SW, AS-LC, AS-BR, AS-LB, AS-DB, AS-GR, AS-SG, and AS-LG. They are best and most economically applied in dyeing on a package machine, dye beck, jigs and Klauder-Weldon machines.

The non-substantive naphthols are those brands which do not have any great affinity for the fiber and do not fix themselves sufficiently to permit salt rinsing and should be dried after naphtholating. The non-substantive group includes Naphthol AS, AS-MX, AS-D, AS-OL, AS-BG, AS-G, AS-BS, AS-RL, AS-BO, and AS-E. They are best and economically applied by padding and drying the naphtholated material before coupling.

The exception to the rule is Naphthol AS-TR and AS-ITR. These naphthols, while they do not exhaust very well, do however fix themselves sufficiently to permit salt rinsing and they can therefore be used for padding or dyeing.

Package Dyeing

The first procedure in package dyeing is to boil out the packages with a synthetic detergent and soda ash at 195°F. to 200°F. to prepare the yarn before dyeing. After the material has been scoured, it is rinsed warm and then cooled at 110°F. ready for the naphtholating. If the packages are not wound too tightly, it is possible to naphtholate the yarn dry, without prewetting, in the package machine since the naphtholating liquor has good wetting properties thereby saving the operations of scouring and rinsing. In this case naphtholating would have to be carried out at 130°F. to 140°F.

For our example tonight, let us take a combination of 3% Naphtol AS-SW coupled with 9% Fast Red Salt PDC in a package machine holding 500 lbs. yarn in 700 gals. water. This would mean that we would need fifteen pounds of Naphtol AS-SW. To dissolve fifteen pounds we would need three and three quarter gallons of alcohol or two pints per pound of Naphtol AS-SW. The naphthol is pasted in a smooth thin paste to which is added three pounds caustic soda flakes previously dissolved in water, or three ounces of caustic soda flakes per pound of Naphtol AS-SW. The resultant solution is then further diluted with 2 gallons cold water or one pint cold water per pound of Naphtol AS-SW.

The dyebath or the expansion tank is sharpened with 21 lbs. caustic soda flakes or three pounds caustic soda per 100 gallons naphtholating liquor. The liquor is circulated for ten minutes and then the dissolved naphthol is slowly added. Naphtholation is carried on for ten minutes; five minutes from the outside in and five minutes from the inside out. The naphthol is then exhausted with 10% salt. It is advisable to split the salt in two portions as the full amount of salt added at one time might precipitate the naphthol. Naphtholation is continued for twenty minutes longer. The naphtholating bath is dropped and the packages are salt rinsed cold with 20% salt. Addition of 4 oz. caustic soda flakes per 100 gallons of water in the salt rinsing bath is a good precaution should the water have a pH lower than 7. Salt rinsing is carried on for 10 minutes and the bath is dropped.

Forty-five pounds of Fast Red Salt PDC or three pounds fast color salt for every pound of naphthol are dissolved by pasting up with warm water at 80°F. A wetting agent may be added to facilitate wetting out the fast color salt. It is then further diluted with twenty to thirty gallons cold water. This solution is added to the expansion tank. Seven pints acetic acid 56% or one pint per 100 gallons is also added to neutralize the caustic soda in the naphtholated packages and to keep the fast color salt acid so that it will not deteriorate in coupling. Coupling is continued for 30 minutes and then dropped. The packages are rinsed cold and soaped as close to the boil as is practically possible. In the case of package machines it is advisable to soap twice.

Let us review the dyeing which we have just completed. We mentioned earlier that the yarn can be naphtholated dry at 130°F. to 140°F. By so doing, the resultant dyeings, as a rule have better crock fastness.

SALT RINSING.—A good grade of common salt should be used since it has been found that common salt containing calcium or magnesium, as is frequently the case, will hydrolize the naphthol and cause it to precipitate. Glauber's salt, always free from calcium and magnesium, can also be used to advantage for salt rinsing and exhausting the naphthol.

The combination of Naphthol AS-SW coupled with Fast Red Salt PDC is a straight combination and should not give us any difficulties in dyeing in the package machine; but let us assume that we have a combination of 3% Naphtol AS-SW shaded with .25% Napthol AS-SG and coupled with Fast Red Salt PDC. We know that Naphtol AS-SW will not exhaust itself very rapidly and should dye level. We also know that Napthol AS-SG has a rapid rate of exhaust and in this case we are only using a small amount for shading. In dyeing such a combination, it would be advisable to add the Naphtol AS-SW first, naphtholate ten minutes so as to saturate the packages with Naphtol AS-SW and then add the small amount of Napthol AS-SG. By follow-

* Presented before Canadian Association of Textile Chemists and Colorists, Montreal, October 22, 1949. Published in Canadian Textile Journal.

ing this procedure, level dyeings should be obtained.

Beam Dyeing

The principle of beam dyeing is more or less the same as package dyeing. However, in beam dyeing there is always the possibility of blowing a beam. This is especially so when salt rinsing and coupling. The cold liquor increases the pressure against the beam when circulating from the inside out. To avoid this possibility of blowing a beam it is advisable to keep the amounts of penetrants, wetting agents and caustic soda down to a minimum and to naphtholate, salt rinse and couple, with the liquor circulating from the outside in only. The exhaust of the naphthol can be controlled by temperature.

The same precautions should be followed in beam dyeing as in package dyeing, that is, a pure common salt employed, the addition of the naphthols to the dyebath, etc.

Jig Dyeing

The substantive naphthols are generally employed in jig dyeing, since they are more economical and permit salt rinsing. The material is given a preliminary scouring with a synthetic detergent and soda ash over two to four ends. It is then rinsed warm and cooled to 120°F. ready for naphtholating. It is a good procedure to start naphtholating at 120°F. on the jig to insure penetration and uniformity from end to end.

The jig or dyebath is sharpened with caustic soda and the dissolved naphthol is added over the first and second end. The bath is exhausted with common salt over the third and fourth end. It would be proper to shell the cloth on the third or fourth end to facilitate penetration. At the end of the fourth end if the shade and strength is obtained, the naphtholating bath is dropped, and material is salt rinsed over two ends and then coupled.

In coupling, three-fourths of the dissolved fast color salt is added on the first end and the balance on the second end. Coupling is continued for a total of four to six ends. In coupling it is also advantageous to shell the cloth on the third or fourth end to insure penetration of the Fast Color Salt. After coupling is completed, the material is rinsed cold over two ends and after-treated from four to six ends and then rinsed warm.

The precautions mentioned for package dyeing and beam dyeing also apply to jig dyeing. In the case where a small amount of naphthol is employed for shading such as we had for package dyeing, the precaution would be to add the Naphthol AS-SW over the first and second end and the small amount of Naphthol AS-SG over the third and fourth end. Exhaust with salt over the fifth and sixth end.

Padding

Padding of naphthol is somewhat more varied. If a plant is equipped with a hot flue for drying, then the nonsubstantive naphthols are used since they exhaust very little and are more economically employed in padding. If drying equipment is not available, then the substantive naphthols should be employed since they can be batched up after padding, carried to the jig, salt rinsed and coupled.

The nonsubstantive naphthols, after padding and drying, can be coupled either on the padder, followed by skying or on the Williams Unit and in some cases on the pad steam range.

Water

Water in the application of naphthol plays an important part. We know that hard water or water containing calcium or magnesium salts is detrimental to naphthol dyeing since the naphthol combines to form the calcium and magnesium naphtholate. However, we have also encountered trouble in soft water which often contains quite appreciable amounts of iron. To produce satisfactory dyeings in water of this type, we found that it was necessary to sequester the iron with products such as the Nullapons. If substantive naphthols are employed where salt rinsing is necessary, then the iron must likewise be sequestered in the salt rinsing and coupling bath, in other words, wherever the water containing iron will come in contact with the naphthol itself.

Nylon

Nylon, as you know, can be dyed with acid or acetate colors. The acid colors as a rule will give satisfactory results in fastness properties but do not cover the barre or warp streaks in nylon piece goods. The acetate colors will give good coverage and will not show barre. However, the fastness properties are not satisfactory, especially the wash fastness. By combining a naphthol and a fast color base in the same bath but using a special formula containing Naphtol Assistant GCB, nylon can be dyed with azoic types. The results are very even without any barre showing. The fastness to washing, perspiration, and crocking are very good and the fastness to light will of course vary with the combination employed.

Acetate

By following a similar procedure as with nylon, we are now able to dye acetate fast to washing, perspiration, and gas fading.

Vat Acid—

(Continued from Page 116)

Under such working conditions therefore only the intensified reaction or affinity takes effect. All disturbing occurrences met with when dyeing at 100°C. are here completely absent. Neither the familiar over-reduction of the Indanthrene Blue brands, which must be reckoned with in every continuous method carried out with dyeing or developing baths in any way, nor saponification or dehalogenizing effects can happen during this short period of time, because these are pronounced time reactions.

I would like now to deal with these processes individually. The Bayer Colour Works have lately made extensive and quite successful experiments with a method corresponding to the one discussed; in this process the Electro-Fixer is replaced by a Colloresin steamer. As far as could be ascertained in following up these experiments, the results obtained up to now with this modified process are in full agreement with the practical experiences and theoretical considerations here reported. In the Colloresin steamer we have a temperature of 105-110°C.; during the short period of time of 1 minute in which the goods remain in the steamer, it is of course quite impossible for them to attain 100°C. Thereby, certain limitations arise in regard to depth of shade obtainable, as well as in regard to the dyestuff to be used, namely, that here, even more so than in the case of the Electro-Fixer, the use of the vat acid must be accepted as best suitable for the purpose.

All the other methods employ developing baths, where it is of no significance whether the volume is reduced to a minimum, as for example, in the Williams Unit.

Beginning with the simplest example, the vat acid continuous method on the roller vat: the vat acid, without intermediate drying and without addition of any thickening, is padded on to the material in the usual way and, thereupon, developing is performed immediately in one or two roller becks at 80°C. To compensate for the dissolving out of the dyestuff into the developing liquor, to this is best added a little dye liquor. This necessity shows already that some experience is required to obtain equally dyed piece ends with some degree of certainty. Furthermore, for reasons already discussed, the developing efficiency is limited in comparison with that of a steamer of the type of the Electro-Fixer, so that such a process only comes into consideration for light to medium shades at the most.

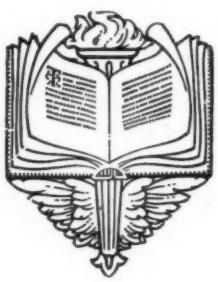
During the war a continuous method of dyeing staple fiber belt webbing was re-

required for a special case. This gave the desired opportunity for detailed study of these circumstances. A navy blue, among other shades, was demanded. We are accustomed to regard Indanthrene Dark Blue BOA, Indanthrene Marine Blue BF and similar dyestuffs as of high affinity, both in regard to exhaustion of the dyebath as well as in speed of absorption by the fiber. But conditions of such roller vat development are so extreme, that under no circumstances is it possible to obtain a full dark blue shade with these aforementioned dyestuffs. The most attainable is a relatively empty medium blue shade. In this concrete case, only a combination of Indanthrene Brilliant Violet 3B with Indanthrene Brilliant Green GG led to the desired result. Both dyestuffs are of about equally high exhaustibility and velocity of absorption by the fiber. In comparison it is to be once again emphasized, that the usual navy or marine blue dyestuffs or combinations function perfectly with the Electro-Fixer. It is worth while therefore, to deal more fully with this example, in order to show the importance of realizing the difference in principle between fixation in the steamer and developing in a blank vat liquor. At some point there is a limit set for all forms of such liquor developments.

In America two remarkable further developments of a simple roller vat arrangement have been brought out. Dupont followed the course of improving the developing efficiency in their pad-steaming process by means of the additional use of steam, and at the same time, reducing the volume of liquor in the developing baths. In practice this is attained in such manner that a closed space filled with steam is formed over the baths, making a kind of closed roller vat. Doubtlessly a certain enhancement of developing efficiency is produced, but not considerably more than that attainable at 80°C. The confinement to developing baths still remains inherently disadvantageous, specially in the case of the derivatives of Indanthron, because that portion of the dyestuff dissolved out of the material is exposed to the continuous action of the hot alkaline reducing liquor. Yet, also this possible source of error need not be given an exaggerated importance. A very interesting further development of the old roller vat is presented by the aforementioned Williams Unit. Here the principle of minimizing the volume of liquor is carried out by means of displacers almost to the extreme limit. In this way, not only the developing efficiency is enhanced, but also, by rapid liquor replenishment, risks due to dyestuffs dissolved from out of the goods into the bath are lessened.

It has been shown that there are extensive possibilities for the application of the vat acid. Its most important decisive qualifications are, concisely, its capability of forming collodial solutions or suspensions of finest division, the absence of affinity, as well as the instantaneous transformation into the sodium leuco compound.

These basic facts can be utilized in the sphere of machine dyeing and also in piece goods dyeing. In the later case the continuous method based on the use of the vat acid, employing the Electro-Fixer as essential and determining component of the equipment, is of particular interest. The preparations of vat acid can be made with absolute safe and sure results.



Book Reviews

American Cotton Handbook

G. R. Merrill, A. R. Macormac, and H. R. Mauersberger. Second Revised Edition, 943 pages. Textile Book Publishers, Inc., New York, N. Y. (1949). $9.50 U. S. and Canada, $10.50 Elsewhere.

The first edition of this well-known handbook was an invaluable reference work on the American cotton industry. In this new revised edition, the text has been brought up-to-date to conform with modern post-war practices. New chapters have been added on bleaching and mercerizing, dyeing, and finishing. Other new material includes chapters on the structure of cellulose and the cotton fiber, chemical testing, and an extensive fifty-page bibliography devoted to cotton processing.

Chapters 14 to 19, embracing approximately the latter 300 pages of the handbook, are devoted to chemical processing and testing of cotton materials. The chemical processing section begins with a discussion of bleaching and processes preparatory to dyeing, and covers treatments of process water, kier boiling, and bleaching with hypochlorites and peroxides. A brief discussion of modern continuous bleaching is included, and the final section of this chapter takes up some of the fundamentals of mercerization practices. There follow chapters on cotton dyeing, in which the methods used for applying the various classes of cotton dyes and the machinery used in cotton dyeings are described, and on printing, in which are described briefly the various printing methods and typical print formulas for the various classes of dyes used in cotton printing. In the chapter on finishing, the effects produced by various physical and chemical treatments are described, and the methods used for the application of natural and synthetic finishing materials are given. The chapter on physical testing is written by Prof. E. R. Schwarz of M.I.T. and describes methods and apparatus for the performance of the usual control tests on fibers, yarns, and fabrics. Mr. Leo J. Sheehan of the Philadelphia QM depot wrote the chapter on chemical testing. Procedures as identification and determination of cotton in blends, determination of degree of damage, identification of some of the more common finishing agents, color fastness tests, etc. are also covered.

This handbook is a good reference work and should be available in any laboratory having to do with cotton materials. The only serious criticism that might be offered is of the space devoted to advertising. The authors attempt to justify the advertising in their preface, but pages of advertising at the front, back, and through the text detract from the general appearance.—J.B.M.

Encyclopedia of Chemical Technology

Edited by R. E. Kirk and D. F. Othmer, Volumes 2 (1948) and 3 (1949). The Interscience Encyclopedia, Inc. New York, N. Y. $20 per volume.

The complete encyclopedia will contain "More than 1,000 authoritative articles in alphabetical arrangement from Abrasives to Zirconium, by experts from the American chemical industry and from research institutions." Volume 2 covers Anthrone to Carbon-Arc; Volume 3 encompasses Carbon (cont'd) to Cincophen. The publisher states that further volumes will appear at seven month intervals, to be complete in ten volumes, about 960 pages per volume.

The text of this very comprehensive reference work is excellent, embracing the entire science of chemistry. The textile chemist will find a proportionate share of the material devoted directly to his field. For example, Volume 2 contains an excellent 54 page discussion of the chemistry and uses of the Azine and Azo dyes by Dawes, Moessinger, and Morse of the General Aniline aid Film Corporation. Similarly, Volume 3 has a 15 page section on the chemical and physical nature of cellulose together with some of the economic aspects of cellulose consumption, written by Barsha and Van Wyck of the Hercules Powder Company. A further important feature is that each article includes a good bibliography of references to the original literature.

The encyclopedia is completely cross-indexed for easy reference. In many instances the subject in question is defined and then references to special phases of the subject are given at length. The subject of bleaching is so treated, several paragraphs being devoted to a discussion of bleaching in general, with cross references to the various aspects of the subject.

These volumes will comprise a most valuable addition to every technical library, for they are an outstanding source of widely diverse chemical information for the industrial chemist and the research chemist.—J.B.M.

Chemical Technology of the Textile Fibers

(German title: Abriss der chemischen Technologie der Textilfasern), 1st edition, 1948; by H. E. Fierz-David and E. Merian; publisher Verlag Birkhäuser, Basle, Switzerland; 295 pages; 107 figures; 7 pages of textile samples; price Swiss Francs 36.50; written in German.

This volume, written by the well-known Swiss authority, Prof. Fierz-David and his assistant E. Merian, is primarily intended for the use of the student of textile chemistry, dyeing, and finishing, rather than the specialist in these fields. No attempt has been made by the authors to deal with any single subject in exhaustive detail, though all principal phases of the field have been treated with clarity and conciseness. The authors attempted, and succeeded to a large degree, to grasp the scope of the whole field and to show the reader where further information may be obtained. Over 400 literature and patent references distributed throughout the text may help the reader in his further study, although these references are not indexed and practically refer only to European authors and inventions.

After an introductory chapter, the authors take up in some detail the vegetable fibers, animal fibers, and the synthetic fibers, both of cellulosic and non-cellulosic origin. The physical and chemical characteristics of each fiber, as well as fiber preparation or filament manufacture, are discussed. The next section of the book deals with the methods, materials, and machinery used in the preparation of the woven material for the dyeing operations. The major part of the book is devoted to the discussion of the dyeing of textile materials, treating each type of fiber separately and discussing the various types of dyes used by means of many recipes, patent references, and discussions of chemical reactions of the various classes of dyestuffs mentioned. The many different types of dyeing machinery are discussed. The printing of textile materials is described in similar detailed fashion, followed by a condensed discussion devoted to the finishing operations and machines.

The appendix contains short test methods for various fastness properties, a trade-name and dyestuff manufacturers index, an author index, and a subject index.

The book is well written and offers a condensed, up-to-date, review of the field.—R.G.H.

—♦ ♦—

Color Council

(Concluded from Page 112)

boundaries rather than central colors. Earlier systems of names present a single color chip, this chip representing the center of the name. The ISCC-NBS system was the first system in which three dimensional boundaries of each color were definitely assigned.

When the Society of Dyers and Colourists in collaboration with the American Association of Textile Chemists and Colorists were deciding upon color names for the new revised *Colour Index*, a system was agreed upon by both associations in which some of the boundaries would be illustrated by swatches in a color chart which would facilitate the naming of colors by different dye manufacturers. However, all of the boundaries were also defined in terms of the ISCC-NBS system. Naturally the ISCC is interested in wide acceptance and use of these color names and would be interested in any criticism of boundaries for color names, or any other comments which any organization using color might wish to offer.

Sample Mounting

Problem 12, Illuminating and viewing conditions in the colorimetry of reflecting materials, is set up for study by a committee under Dr. Judd's chairmanship and is still under study after several year's work.

It is well known that differences in methods of illuminating and viewing glossy or semi-gloss samples will give differences in color. It is not so well known just what the conditions of illuminating and viewing should be in order to reproduce most closely the conditions of "closest color match" between a matte and glossy, or a matte and semi-glossy sample. Such judgments are regularly made every day in commercial practice. What conditions should be specified for an instrument to duplicate the "nearest match" of a good color matcher? This is the problem.

In developing information on this subject, the committee members have made several series of visual comparisons between matte samples and various kinds of glossy samples. To date, work indicates that a single set of conditions can be found for glossy and semi-glossy plastics and paint films and for bronzy printing ink films that will yield the generally accepted characteristic color, but no way has yet been found that promises to yield similar results for lustrous rayon or silk fabrics.

To get these results for glossy plastics and paint films, a single glossy chip together with a series of matte chips has been sent to various people with a request for them to state which matte samples of a series most closely color-match the glossy sample being studied. The larger the percentage of surface reflected light included in the color comparison, the grayer the sample. One very common type of viewing condition, zero-diffuse, used by the General Electric recording spectrophotometer, includes all of the specular light. Another type of viewing condition, the I. C. I. standard conditions of 0-45, is used by the Beckman spectrophotometer and excludes all of the specularly reflected light. About half of the Committee has made reports thus far and the visual estimates are between the two instrumental viewing conditions weighed somewhat more heavily toward the 0-45 condition.

Conclusion

The Inter-Society Color Council is thus actively engaged in the stimulation and coordination of the study of color among its various member bodies and is performing a very useful function for science, art and industry.

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1950, American Association of Textile Chemists and Colorists

FEBRUARY 20, 1950

National Officers of the Association

President
C. NORRIS RABOLD
Erwin Cotton Mills Co.
Cooleemee, N. C.

Vice-Presidents
ARTHUR W. ETCHELLS
Hellwig Dyeing Corp.
Philadelphia, Pa.
GEORGE O. LINBERG
Monsanto Chemical Co.
Boston, Mass.

Treasurer
WILLIAM R. MOORHOUSE
National Aniline Division, Allied Chemical & Dye Corp., 150 Causeway Street, Boston 14, Massachusetts

Secretary
HAROLD C. CHAPIN
Lowell Textile Institute, Lowell, Massachusetts

Founder
LOUIS A. OLNEY
(Deceased)

Chairman of the Research Committee
J. ROBERT BONNAR
General Dyestuff Corp.,
435 Hudson Street, New York 14, N. Y.

Director of Research
HAROLD W. STIEGLER
Lowell Textile Institute, Lowell, Massachusetts

Councilors

Representing Sections

Rhode Island: GEORGE H. WOOD, JR., RAYMOND W. JACOBY, EDWARD J. ALLARD, ROBERT W. JOERGER.
Philadelphia: ONSLOW B. HAGER, M. H. KLEIN, FREDERICK W. TRAUT, JAMES DIXON, JACKSON A. WOODRUFF, WALTER F. FANCOURT, 3rd.
New York: PAUL J. LUCK, WILLIAM A. HOLST, JR., FRANCIS S. RICHARDSON, CHARLES W. DORN, HERMAN E. HAGER, HERMAN E. WILDE.
Northern New England: KENNETH R. FOX, JOHN M. GOULD, C. WENDALL LEVER.
Piedmont: JOHN B. NEELY, WYSS L. BARKER, PELHAM E. SMITH, SUMNER H. WILLIAMS.
Southeastern: A. KEMPTON HAYNES, WALTER M. SCOTT.
South Central: JACK ANDERSON.
Mid-West: FREDERICK E. HILGER, JOSEPH H. JONES.
Western New England: HAROLD H. TAYLOR.
Pacific Southwest: FRANK P. BRENNAN.
Hudson-Mohawk: ALBERT E. HERRMANN, JR.
Pacific Northwest: CHARLES K. BISHOP.

Past Presidents
ELVIN H. KILLHEFFER, P. J. WOOD, WILLIAM H. CADY, ALBAN EAVENSON, CARL Z. DRAVES, THOMAS R. SMITH, WILLIAM D. APPEL, HENRY F. HERRMANN.

Standing Committees of the Council and their Chairmen

Executive Committee on Research
J. ROBERT BONNAR, *Chairman*

Publicity
PAUL J. LUCK, *Chairman*

Conventions
KENNETH H. BARNARD, *Chairman*

Appropriations
WILLIAM R. MOORHOUSE, *Chairman*

Constitution and Bylaws
HAROLD C. CHAPIN, *Chairman*

Membership and Local Sections
JOHN N. DALTON, *Chairman*

Corporate Membership
LEONARD S. LITTLE, *Chairman*

Publications
PERCIVAL THEEL, *Chairman*

Technical Programs
ARTHUR W. ETCHELLS, *Chairman*

Local Sections and their Officers

Northern New England Section

Chairman
FRANK J. O'NEIL
Pacific Mills
Lawrence, Massachusetts

Secretary
AZEL W. MACK
Dexter Chemical Corp., 581 Boylston St., Boston 16, Massachusetts

Vice-Chairman — RALPH E. HALE
Treasurer — WILLIAM W. PENNOCK

Rhode Island Section

Chairman
ELLIOT BROADBENT
Glenlyon Print Works
Phillipsdale, R. I.

Secretary
EMORY A. RICHARDS
Airedale Worsted Mills, Inc., 1 Main Street, Woonsocket, Rhode Island

Vice-Chairman — PETER G. KOLUPAEV
Treasurer — ROBERT R. FARWELL

New York Section

Chairman
CHARLES W. DORN
J. C. Penney Co., 330 West 34th Street, New York 1, N. Y.

Secretary
NORMAN A. JOHNSON
American Dyestuff Reporter, One Madison Ave., New York 10, N. Y

Vice-Chairman — PAUL J. LUCK
Treasurer — JOHN H. HENNESSEY

Philadelphia Section

Chairman
RICHARD B. STEHLE
Allegheny Dye Works
Trenton & Allegheny Aves., Philadelphia 34, Pa.

Secretary
THOMAS H. HART
Hart Products Corp., P. O. Box 5020
Philadelphia 11, Pennsylvania

Vice-Chairman — A. E. RAIMO
Treasurer — EDWARD C. DIEHL

Piedmont Section

Chairman
ROBERT H. SMITH
High Point Chemical Mfg. Co.
High Point, N. C.

Secretary
W. CHESTER COBB
Arnold Hoffman & Co., Inc.
2130 N. Tryon St., Charlotte, N. C.

Vice-Chairman — EDWIN A. BRIGGS
Treasurer — R. HOBART SOUTHER

South Central Section

Chairman
JOSEPH H. O'NEILL
Riegel Textile Corp.
Trion, Ga.

Secretary
CHARLES P. GORDON, JR.
Riegel Textile Corp.
Trion, Ga.

Vice-Chairman — WILLIAM T. EVANS
Treasurer — EVERETT E. BURGNER, JR.

Mid-West Section

Chairman
ELLIOTT MORRILL
The Best Foods, Inc., 1436 West Morris St.
Indianapolis, Ind.

Secretary
J. E. A. SCHRODER
General Dyestuff Corp., 731 Plymouth St.
Chicago 5, Ill.

Vice-Chairman — LEONARD J. ARMSTRONG
Treasurer — H. THOMPSON LATHAM

Southeastern Section

Chairman
H. GILLESPIE SMITH
Calco Chemical Div.
American Cyanamid Co.
Atlanta, Ga.

Secretary
R. E. HUDSON, JR.
Southern Research Institute
91 South 20th St., Birmingham, Ala.

Vice-Chairman — S. JACK DAVIS
Treasurer — ADAM FISHER, JR.

Western New England Section

Chairman
J. EDWARD LYNN
American Cyanamid Company
Stamford, Connecticut

Secretary
ARTHUR S. NYQUIST
American Cyanamid Co.
Stamford, Conn.

Vice-Chairman — RAYMOND J. CAREY
Treasurer — ROBERT N. BROWNLEE

Pacific Southwest Section

Chairman
H. A. DES MARAIS
General Dyestuff Corp., 37 Clementina St.
San Francisco 5, California

Secretary
FREDERICK L. WILHELM
American Aniline Products, Inc.
2313 East Eighth St., Los Angeles 21, California

Vice-Chairman — RUSSELL B. COLEMAN
Treasurer — CHARLES H. DUNKER

Hudson-Mohawk Section

Chairman
DAVID O. HAMER, JR.
Arkansas Co., Inc., P.O. Box 37
Tribes Hill, N. Y.

Secretary
WILLIAM A. NELSON
Ritter Chemical Company, Inc., 403 W. Main St., Amsterdam, New York

Vice-Chairman — JOHN J. HANLON
Treasurer — IRWIN J. SMITH

Pacific Northwest Section

Chairman
EARL B. BREARLEY
Jantzen Knitting Mills, 411 N.E. 19th Ave.
Portland 14, Ore.

Secretary
ROBERT M. TRUE
General Dyestuff Corp., 1102 Terminal Sales Bldg.
Portland 5, Ore.

Vice Chairman — OTTO E. SCHMIDT
Treasurer — WILLIAM C. MARSHALL

STUDENT CHAPTERS: LOWELL TEXTILE INSTITUTE, NORTH CAROLINA STATE COLLEGE, PHILADELPHIA TEXTILE INSTITUTE, NEW BEDFORD TEXTILE INSTITUTE, GEORGIA INSTITUTE OF TECHNOLOGY, CLEMSON COLLEGE, BRADFORD DURFEE TECHNICAL INSTITUTE, UTICA TECHNICAL INSTITUTE.

Noncellulosic Group—

THE OCCURRENCE OF SOLUBLE WOOL-SUBSTANCE AS A RESULT OF THE SULFURIC ACID CARBONIZING PROCESS*

JACKSON BAUER

Fred Whitaker Company

Introductory Considerations

IN commercial wool processing, a point of prime consideration is the yield of processed wool that may be expected at the completion of the process. When wool contains sufficient vegetable matter to require carbonizing, the loss of yield in processing may be of such magnitude as to become an economic problem. Considerable experience has shown that not all of the wool proved present in a given lot by laboratory determination of clean content can be recovered in the commercial carbonizing and neutralizing process.

Since the process of wet carbonizing of wool with sulfuric acid, as it is generally carried out in commercial practice, is complex at best, the loss of yield is spread over most of the steps in the process. Much of this loss is mechanical and may be traced to unavoidable fiber breakage, accompanied by loss of wool in dusters and other machines.

However, it was suspected that in removing acid from the carbonized wool by neutralization, there might also be removed a significant quantity of wool substance such as degradation products produced by carbonizing.

Of course the purchaser of carbonized and neutralized wools is not troubled by these losses since the processed wool already has suffered loss of yield. It is likely, however, that the user of scoured wools will also suffer some small weight loss of "wool substance" in such processes as dyeing, fulling or finishing.

In this paper the term "bone dry" refers to wool dried to constant weight in a forced draft dryer at 225°F. unless other conditions are specified. The determination of sulfuric acid on wool was essentially the pyridine method of Eavenson and Creely *(1)* and was craried out on bone dry samples. pH determinations on wool were made by immersing a 5 gm. sample in 150 ml. of boiling distilled water, cooling the beaker to room temperature, removing the wool and testing the pH of the water extract on a standard pH meter equipped with glass and calomel electrodes. Ash tests were run by igniting bone dry wool samples over a Fisher burner. Grease extractions were run with carbon tetrachloride at room temperature to avoid the removal of acid from the wool incurred in the usual alcohol soxhlet test. References will be made to this point later.

Tests and Observations

As a first step in ascertaining the existence of such a loss, a 20 gm. sample of commercially carbonized 36/40 BA wool, having an acid content of 6.7% H_2SO_4 by weight (as determined by the pyridine titration), was carefully neutralized in dilute ammonia, rinsed and dried to constant weight of 18.4 grams, showing loss of 1.6 gms. or 8%. This represented a loss of 1.3% above the acid content and seemed to confirm original suspicions that a significant loss of wool substance might be expected. Since a comparatively small sample had been used and extractibles and ash determinations had not been made, another test was run on a 50 gm. sample of commercially carbonized but unneutralized 48's South American wool, analyzed to 0.71% grease, 0.69% ash and 7.7% H_2SO_4 as determined by titartion. The sample was neutralized, rinsed and dried to constant weight of 45.1 gms. with 1.1% ash and 0.47% grease content. Corrected to the grease and ash content of the original carbonized wool, this would be 45.02 gms., or a loss by neutralization of 9.96%, 2.26% greater than would have been expected from acid removal alone.

In view of these results, a number of commercially carbonized but unneutralized wools were obtained. The samples were taken from the regular run in commercial lots, the processing having been done at various mills. It was assumed that no significant damage would occur in bone drying these samples since Harris *(2)* has shown that damage occurs only in the first few minutes of carbonizing baking.

Accordingly 50 gram samples of bone dry carbonized wool were carefully neutralized by immersion in 2 baths of dilute ammonia followed by a series of water rinses. The neutralized wool was passed through laboratory squeeze rolls to remove excess liquor and dried to constant weight. On the neutralized wool, determinations of ash and CCl_4 extractibles were made. Prior to neutralizing, the carbonized wools were also tested for ash and CCl_4 extractibles and these figures were compared with the corresponding figures for the neutralized wool in

TABLE I

Losses Resulting from Laboratory Neutralizing of Commercially Carbonized Wools as Compared with Losses Expected by Removal of Acid Content

Type Wool	*Wgt. Loss by Ammonia Neutralizing & Water Rinsing Corrected for Change in Ash and Extractibles* %	*Expected Loss from Acid Removal Alone* %	*Loss of Wool Substance by Difference* %
48's BA	9.97	7.70	2.27
36/40's BA	9.47	7.20	2.27
36/40's BA	7.40	6.84	0.56
36/40's BA	8.38	6.84	1.54
36/40's BA	8.68	6.72	1.96
60/64's Aust.	9.55	5.90	3.65
36/40's BA	9.90	6.60	3.30
64/70's Cape	10.27	6.80	3.47
		Average Loss	2.38

* Presented at the Atlantic City Convention, October 14, 1949.

determining the yield.

The results of these tests are shown in Table I. The average loss of 2.38% on these commercially carbonized wools thus appeared to bear out the earlier tests. It will be seen that a considerable variation in loss occurred from one wool to another. It was felt that these variations might be due to differences in commercial processing conditions, since the loss of yield was obviously not due alone to % residual acid on the carbonized wool. However, it should be noted that the fine wools exhibited a greater loss than did the coarse wools.

Since the results at this point were all obtained on wool which had already been carbonized, it was felt that tests should be run in which both the carbonizing and neutralizing procedure would be carried out in the laboratory to eliminate the question of reliability of the acid content determination. *(1)*.

Samples of two lots of 60/64's dry French combed Aust. wool top were used for these tests. The wool was first extracted with carbon tetrachloride, rinsed and dried to constant weight in the laboratory oven, and 100 gram samples of each top were carefully weighed for the tests. From the remainder of the samples, portions were taken for determination of the ash and extractibles content of each top. The weighed top samples were then immersed for 1.5 minutes in a 6% H_2SO_4 solution (containing 0.1% Tergitol 4). On removal from the solution, each sample was passed through the laboratory squeeze rolls between 2 sheets of paper toweling to insure complete recovery of the fiber. These were in single end form to avoid doubling the top which might cause uneven extraction of the carbonizing liquor. The samples were then spread evenly over one oven shelf and dried to constant weight at 225°F. One-half of each dried sample was then used for obtaining representative portions on which ash and alcohol soxhlet extractibles determinations were made. The remaining half of each dried sample was then water rinsed and dilute ammonia was used to bring the pH of the wool to 7.0. These portions were squeezed and dried to constant weight and determinations of ash and extractibles contents were made on each. The results of these tests are shown in Table II.

The original plan of this study was to adjust the yield of neutralized wool by the ash and alcohol extractibles, and also to report this as a percentage of the adjusted weight of the carbonized wool before neutralizing. This proved impossible, however, in view of the extremely high percentages of alcohol extractibles obtained on the carbonized wools. Incidentally, it should be noted that the neutralized wools also showed higher alcohol extractibles than did the original wool.

Ryberg *(3)* has shown that the standard alcohol soxhlet method removes from scoured wool some wool substance along with any grease or soaps present. Haller *(4)* has substantiated this finding and has suggested that as long as alcohol extractions are made on the same sample, some substance would probably be removed.

It would, therefore, seem that the alcohol soxhlet test is unreliable on carbonized or carbonized and neutralized wools since, on carbonized wool, the extraction apparently accounts for most of the acid present as well as grease, soap and wool-substance. From neutralized wool, traces of residual salts as well as grease, soap and wool-substance may be removed.

Accordingly, the percentage of neutralized wool recovered from the carbonized wool was, in this instance, corrected only for ash content. The carbonized wools in Table II were analyzed for H_2SO_4 content and the average loss was found to be 3.87% more than would have been expected from acid removal alone. This 3.87% loss, corrected only for the ash, is probably not as reliable as desired, but is in fair agreement with the average of 3.56% for the two samples reported in the last column of Table II.

Some insight into the nature of this extra loss was obtained by preliminary protein detection. Samples of carbonized wools were first given a water wash and than followed by a series of dilute ammonia rinses. The rinses were examined for pH and, where alkaline, were treated with dilute acid to bring the pH to about 4.0. The samples were then treated with Millon's reagent and allowed to stand overnight. A pink color and some development of flocculent precipitate was produced in the solutions, indicating the presence of protein.

It was, therefore, decided to examine the neutralizing solutions more closely with observations on successive baths such as are used in the continuous commercial process. A five gram sample (bone dry weight) of the wool, carbonized as sample No. 1 in Table II, was immersed in 100 ml. of water followed by five washes with 0.1% ammonia. Each immersion was for three minutes at 80°F., after which the wool was removed, squeezed by hand and placed in the next bath. Each ammonia wash was only 80 ml. instead of 100 ml. since the wool was wet on entering. After removal from the last bath, the wool was dried to constant weight. The percentage loss was determined and compared with the acid content of the original carbonized wool. After removal of the wool from each bath, the pH of the bath liquor was tested and observations were made on the appearance of the liquor. The results are given in Tables III-A and III-B. These bath liquors were also tested for soluble protein with Millon's reagent, and the results will be discussed later. The figures in Table III-A and III-B show the progressive increase in pH of the neutralizing baths after removal of the acid wool. The indicated appearance of these solutions is typical of colloidal hydrolyzed protein matter. The neutralizing loss is similar to that previously noted, and although obtained on laboratory carbonized samples, is in good agreement with results obtained on commercially carbonized wool sliver as shown later.

More elaborate tests were run on sample No. 3, a 60/64's Aust. wool commercially scoured and carbonized and then converted to sliver form. Duplicate tests

TABLE II

Loss in Scoured Weight of Wool When Laboratory Carbonized and Neutralized

	Bone Dry Weight Sample Used gms.	*Ash and Alcohol Extractibles Content of Wool*	*Ingoing* %	*Carbonized* %	*Neutralized* %	*Bone Dry Wgt. Wool after 1.5 Min. Bath of 6% H_2SO_4, Squeezed and Oven Dried* gms.	*Actual Weight of Neutralized Wool Bone Dry* gms.	*Weight of Neut. Wool Adjusted for Ash and Extractibles* gms.	*Loss Due to Carbonizing and Neutralizing* gms.
Sample No. 1	100.00	Ash	1.15	0.16	1.27	109.32	97.34	97.02	2.98
		Extr.	1.30	7.80	1.50				
		Total	2.45	7.96	2.77				
Sample No. 2	100.00	Ash	0.58	0.19	0.86				
		Extr.	1.50	7.50	2.20				
		Total	2.08	7.69	3.06	110.07	96.88	95.86	4.14

TABLE III-A

Observations on Neutralizing Solutions at 80°F. From Laboratory Carbonized Wool, Sample No. 1 and Neutralizing Loss

Neutralizing Procedure	*pH of Neutralizing Bath after Removing Wool*	*Appearance of Neutralizing Bath after Removing Wool*
Water Wash	1.75	Heavy Cloudiness, Yellow
1st Ammonia Wash	4.10	Hazy, Light Yellow
2nd Ammonia Wash	8.25	Heavy Cloudiness, Lighter Yellow
3rd Ammonia Wash	9.40	Less Heavy Cloudiness, Pale Yellow
4th Ammonia Wash	9.85	Slight Cloudiness
5th Ammonia Wash	10.0	Hazy

TABLE III-B

pH of Finished Wool	7.00
% Loss in Weight Neutralized Wool	13.69
% H_2SO_4 of Original Carbonized Wool	9.13
% Wgt. Loss Above H_2SO_4 Content	4.56

were run on bone dry 50 gram samples. In one test the entire 50 gm. sample was immersed in one liter of water, followed by five successive ammonia washes of 800 ml. at the same concentration used in the previous test, squeezed and dried to constant weight. The percentage loss was determined and compared with the acid content of the carbonized sliver. In the other test, the bath concentrations, period of immersion (3 min.) and ingoing weight (50 gms. bone dry) were the same; after removal of the wool from each bath a sample of wool was removed and dried and determinations of pH and acid content were made. Instead of each ammonia bath being 800 ml, however, the volume of the successive baths was decreased in proportion as the small samples of wool were removed in order to maintain approximately the same ratio of stock to liquor. All the tests with ammonia on this wool were duplicated with soda ash solution on additional samples of the same sliver. The soda ash solution was of such strength as to be equivalent to the ammonia solution in neutralizing power. The data concerning both the ammonia and soda ash neutralizing tests are given in Table IV. It will be seen that the pH of the neutralizing bath is no indication of the pH of the wool since equilibrium cannot be reached in such a short period of time. In all tests the acid content of the wool decreased progressively as expected. While soda ash appears to be the more effective neutralizing agent, it must be remembered that any excess of ammonia left on the wool would be volatilized in drying whereas residual soda ash would dry on the unrinsed wool. Separate tests indicated approximately equal neutralizing efficiency when the wool was thoroughly rinsed after the last neutralizing bath. It should be pointed out that the titration for % H_2SO_4 is with phenolphthalein as indicator. This turns pink at pH about 8.2 and thus accounts for wool with pH between 7 and 8 showing an acid content.

In Table V the neutralizing loss of the wool treated in Table IV is shown. Again, the lower loss with soda ash appears to be due to drying on the wool of excess soda ash and/or sodium sulfate.

Reference has been made to tests on the neutralizing liquors with Millon's reagent as evidence of the presence of soluble protein material. In Table VI detailed observations are given on the appearance of the neutralizing baths used with samples No. 1 and No. 3. In all cases the neutralizing solutions were filtered and brought to pH 3.0-4.0 before testing with Millon's reagent. The use of Millon's reagent was selected as a representative test for a specific group in wool, in this case the phenolic group of tyrosine, one of the principal amino acids of wool. Several of the solutions were also tested by the biuret reaction. This test indicates the presence of peptide linkages of a longer chain when a blue-violet color is produced; with a shorter chain or smaller molecules the color shifts toward pink. *(5)* In most cases the biuret test developed a pink color with the neutralizing solutions, indicating a substantial degree of hydrolysis of this solubilized wool protein. While the figures reported in table VI are not intended to give an accurate quantitative picture of total protein present in the neutralizing solutions, they do indicate that solubilized protein is removed in water as well as in alkaline solutions. It would appear that ammonia is more effective in this respect than soda ash solutions since the fifth ammonia wash had only 1% flocculation, the successive baths showing a progressive decrease in precipitate; with the soda ash solutions, the volume of floc was nearly the same for each wash.

In making the Millon test, the reagent was added to the individual bath samples and shaken. With both ammonia and soda ash solutions, a foam developed which persisted for several hours, a surface active phenomenon characteristic of soluble protein matter.

Another interesting point was noted in samples of the neutralizing bath which were acidified without the addition of Millon's reagent. After standing a few days, the baths developed a mold which continued to increase for a week or more. This situation also occurred in both ammonia and soda ash baths.

As an additional check on the laboratory tests, samples of soda ash neutralizing liquors from a commercial line of scouring bowls were obtained after the solutions had been used continuously for 24 hours with counterflow. These samples were also filtered and brought to a pH of 3-4 and the Millon's reagent added. In all cases the protein reaction was very pronounced.

Since the tests at this point had only established the existence of a substantial loss of wool in the neutralizing process but had not shown what factors influenced this loss quantitatively, a series of laboratory tests were run to determine how the principal carbonizing variables influence the loss.

For these tests the 60/64's dry combed French top previously referred to as Sample No. 2 was used. Approximately five gram samples were used which could be accurately weighed in convenient sized weighing bottles.

TABLE IV

Comparison of Ammonia vs. Soda Ash Neutralizing at 80°F. of Carbonized Wool, Sample No. 3 (Tests Made After Wool was Removed from Bath)

	Entire 50 gm. Sample Run	*Separate Samples Taken for Testing*		
Neutralizing Procedure	*pH of Bath*	*pH of Bath*	*pH of Wool*	*% H_2SO_4 Remaining on Wool*
Water Wash	2.20	2.15	2.35	4.82
1st Ammonia Wash	4.70	6.60	3.35	1.39
2nd Ammonia Wash	7.70	8.75	6.05	0.33
3rd Ammonia Wash	9.25	9.70	6.65	0.18
4th Ammonia Wash	9.90	9.90	7.15	0.07
5th Ammonia Wash	10.00	9.95	7.35	0.01
Original Carbonized Unneutralized Wool			2.00	6.40
Water Wash	2.25	2.20	2.60	4.72
1st Soda Ash Wash	6.30	6.30	4.35	1.58
2nd Soda Ash Wash	9.50	9.45	6.30	0.33
3rd Soda Ash Wash	9.90	9.85	7.70	0.07
4th Soda Ash Wash	10.30	10.30	7.70	0.07
5th Soda Ash Wash	10.35	10.35	8.20	0.00

The wool was first purified by extraction with carbon tetrachloride followed by ethyl alcohol and, finally, distilled water. Samples of this extracted wool were then dried to constant weight at 225°F. weighed and wet out for 2 minutes at 82°F. in 250 ml. of a sulfuric acid solution made with distilled water, then squeezed twice through the laboratory squeeze rolls between paper toweling. The acid treated samples were then immediately transferred to a specially built, electrically heated, high velocity forced draft dryer for prescribed periods of time at a controlled temperature. The wool samples were run individually and were evenly spread out for uniformity of drying. The air flow in the dryer through the wool was approx. 210 lineal feet per minute. The 550 c.f.m. turn-over of air in the dryer, with approx. 40% of the air being exhausted and 60% recirculated, assured no significant build up of humidity in the dryer at any stage of the drying operation. In order not to introduce too many complications, no attempt was made to distinguish between the drying stage and the baking or carbonizing stage of the operation. For this study the entire operation is simply referred to as "drying".

After the designated drying period the wool was removed from the oven, the weight noted, and the neutralizing and rinsing procedure followed immediately. This procedure, designed to remove all soluble matter present, was as follows: The wool was given one distilled water rinse of 2 minutes, squeezed, transferred to a 0.25% ammonia bath for 2 minutes, squeezed, and then put through 10 successive distilled water rinses, each followed by a squeeze. After the last rinse the sample was twice passed through the laboratory squeeze rolls. All baths were run at 82°F. It was found that by using this procedure, all samples were finished very close to pH 7.0. Tests by Millon's reagent on the final rinses indicated that essentially all solubilized protein matter had been removed before the last rinse. The neutralized wool was then dried to constant weight at 225°F. and weighed in a weighing bottle after cooling in the desiccator. The percentage loss in weight was then calculated. A number of spot tests showed that the combined ash and CCl_4 extractibles were reduced by 0.4% in the processed samples. This figure was subtracted from the total loss to indicate wool loss not due to ash and extractibles reduction. Of course the point is open as to how much actual ash and extractibles should be considered part of the wool substance.

The results of these studies are shown in table VII. It will be seen that under certain conditions the corrected loss is practically zero, although the actual loss may be significant.

A rather irregular pattern of losses was noted at drying temperatures of 160°F, which seems to deserve further study. One possible reason is that the limited drying times employed at this temperature probably resulted in drying being stopped on a steep part of the drying curve. Any small drying differences at this temperature may have influenced the results.

In most cases the percentage losses reported are the average of several tests run to check the validity of results.

The last test reported in table VII is interesting. This sample was dried for 12 minutes at 160°F., followed by 8 minutes at 240°F. The loss of 2.66% is considerably less than the 4.10% loss when 240°F. is used throughout for 20 minutes drying time, and is even less than the 3.28% loss at 240°F. for 9 minutes.

This test would seem in agreement with the previously mentioned conclusion of Harris *(2)* that deterioration takes place in the first few minutes of baking, after which no further breakdown occurs.

In Fig. 1 the percentage total loss is plotted as a function of acid strength for a typical drying time of 12 minutes and temperature of 240°F. It is obvious that control of the acid bath concentration is vital.

Fig. 2 shows that similar increase of loss occurs as the drying temperature is increased. A typical concentration of 5% H_2SO_4 and drying time of 12 minutes, was used.

Fig. 3 shows that the loss is also a function of time in the dryer for the typical conditions of 5% H_2SO_4 and 240°F. dryer temperature. The broken line on this graph shows a drying rate curve under conditions of the test. The sample has reached practically constant weight in

TABLE V

Ammonia vs. Soda Ash Neutralizing Loss, Sample No. 3

	Ammonia Neutralizing	*Soda Ash Neutralizing*
Wgt. of Bone Dry Wool Sample, gms.	50.0	50.0
Wgt. after Neutralizing, gms.	44.6	45.0
Loss in Wgt. by Neutralizing, gms.	5.4	5.0
Loss in Wgt. by Neutralizing, %	10.8	10.0
Acid Content of Carbonized Wool, % H_2SO_4	6.4	6.4
Loss in Excess of Acid Content %	4.4	3.6

TABLE VI

Protein Tests by Millon's Reagent on Laboratory Neutralizing Bath Liquors (Reported as % by Vol. of Settleable Flocculation After 24 Hours)

Neutralizing Procedure	*Ammonia Neutralizing of Sample No. 1 % Floc.*	*Ammonia Neutralizing of Sample No 3 % Floc.*	*Soda Ash Neutralizing of Sample No. 3 % Floc.*
Water Wash	10	6	4
1st Neutr. Bath	6	4	3
2nd Neutr. Bath	3	4	3
3rd Neutr. Bath	2	3	3
4th Neutr. Bath	1	2	2
5th Neutr. Bath	1	1	3

TABLE VII

Loss in Scoured Weight of Wool When Laboratory Carbonized and Neutralized Showing Variation with Acid Concentrations, Drying Time and Temperature

H_2SO_4 Strength %	*Time in Dryer Min.*	*Temp. in Dryer °F.*	*Actual Loss of Wool after Carbonizing and Neutralizing %*	*Loss of Wool after Carb. & Neut. Corrected for Av. reduction in Ash & Extr. %*
1	12	240	1.52	1.4
3	12	240	2.46	2.1
5	12	240	3.60	3.2
7	12	240	4.13	3.7
9	12	240	5.48	5.1
5	0	240	0.49	0.1
5	3	240	1.43	1.0
5	6	240	2.37	2.0
5	9	240	3.28	2.9
5	16	240	3.84	3.4
5	20	240	4.10	3.7
5	12	160	0.45	0.1
5	12	180	0.85	0.5
5	12	200	1.78	1.4
5	12	280	4.95	4.6
1	12	160	1.07	0.6
3	12	160	1.17	0.8
7	12	160	0.44	0.0
9	12	160	0.59	0.2
5	(12 + 8)	(160 > 240)	2.66	2.3

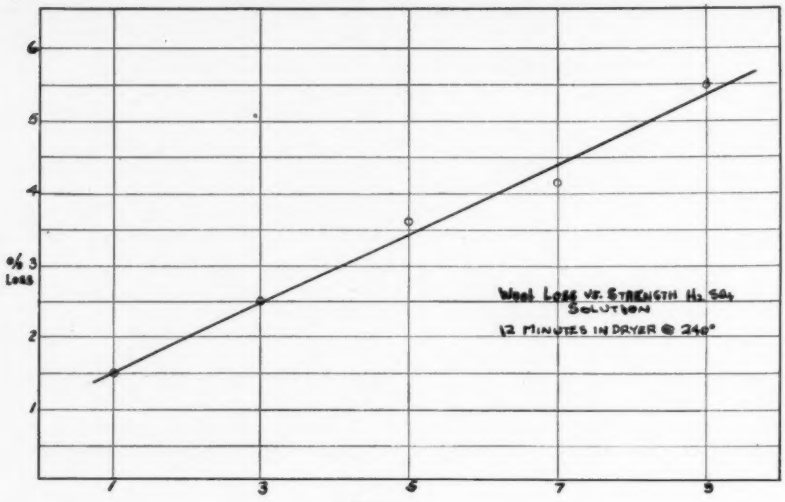


Figure 1

6 minutes. Shortly after this time, at 9 minutes drying time, there is a definite leveling off in the wool loss curve, although damage has apparently not entirely stopped increasing.

Another interesting point on Fig. 3 is the zero time point. This was determined by transferring the wet acid treated wool directly from the acid bath, after squeezing, to the neutralizing and rinsing operation without resorting to the drying process. The loss at this point is entirely accounted for by the reduction in ash and CCl_4 extractibles. This would seem to indicate that this damage to wool does not take place in the wet phase of the carbonizing operation, but is confined to action in the dryer.

It thus appears that all three variables tested influence the extent of wool loss. In practice, the selection of a given set of conditions is always influenced by effectiveness in removal of vegetable matter which, after all, is the purpose of carbonizing.

It would appear that the techniques employed in this work might be used for estimating the extent of damage caused by a given carbonizing system. It would be necessary to have a sample of the carbonized but unneutralized wool for such a test. The procedure would be to test the wool for its acid content, then neutralize and rinse a weighed sample of the acid wool, dry and weigh. The difference between the loss expected by removal of acid, extractibles and ash and the neutralizing loss would then give an indication of the damage incurred in carbonizing. The practical significance of such a test would be in giving an idea of loss to be expected in the course of subsequent wet processing.

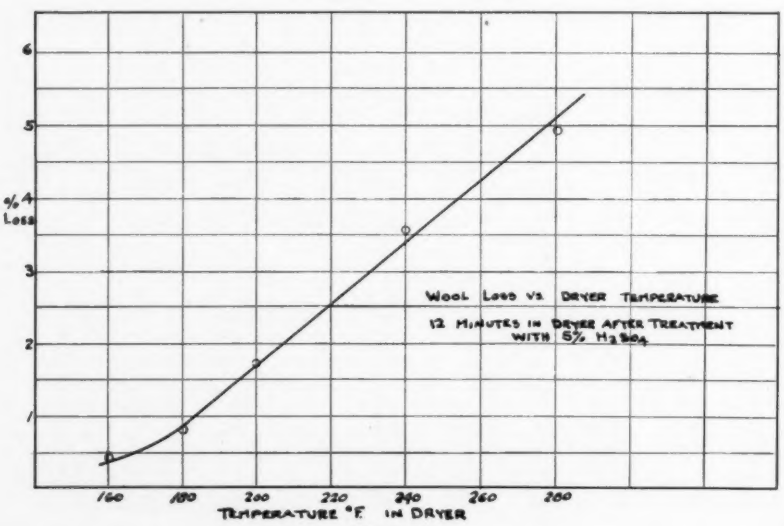


Figure 2

Theoretical Considerations

The mechanism involved in the loss of wool may probably be explained in terms of acid hydrolysis of wool protein. Part of the wool is renedered soluble as its peptide bonds are hydrolyzed. In fact, sulfuric acid was the first acid purposely used for the hydrolysis of proteins *(6)*. The amount of wool substance dissolved might be considered a measure of the extent of hydrolysis of the wool *(7)* incurred in carbonizing. A carbonized wool exhibiting high protein loss has been found capable of more ready neutralization than wool showing a small loss. One reason is that the solubilized portion of the protein, beside containing the acid with which it reacted in the first place, should contain also an increased amount of nitrogen, causing a greater acid combining capacity.

If this is so, it would seem likely that the total nitrogen content of wool would be reduced when it is subjected to carbonizing and neutralizing, since nitrogen, in the form of free amino and imino groups and in peptide linkages, would be the focal point of attack by the acid. Some evidence to support this point was obtained by nitrogen determinations on wool previously extracted with carbon terachloride, alcohol and distilled water. The water was carbonized and neutralized by the procedure given for the tests in table VII, except that soda ash was used as the neutralizing agent instead of ammonia. A loss of 1.88% in weight was noted in the sample. The uncarbonized wool had nitrogen content of 16.39%, determined by Kjeldahl analysis. Assuming this wool to consist entirely of protein, for convenience of comparison, the factor for conversion of nitrogen to protein would be 6.1 instead of the usual 6.25. The carbonized and neutralized wool had a nitrogen content of 15.61%, which would account only for a protein content of 95.22% using the factor of 6.1. On the other hand, the combined neutralizing solutions had a nitrogen content equivalent of 0.77% based on the original uncarbonized wool weight, and would have accounted for 4.7% of dissolved protein. Thus, the dissolved protein must have been relatively rich in nitrogen while the carbonized and neutralized wool had its nitrogen content selectively reduced. These data are summarized in table VIII. It will also be seen that most of the nitrogen present in the solubilized portion of the wool is in the form of amino nitrogen, which would suggest the presence of a large proportion of amino or imino groups and a relatively small proportion of peptide nitrogen.

TABLE VIII

Nitrogen Analyses Incident to Laboratory Carbonizing and Neutralizing of Sample No. 2, Having a Neutralizing Weight Loss of 1.88%

	Ammonia Nitrogen gms.	*Total Nitrogen gms.*	*Total Nitrogen Content based on weight uncarbonized wool %*	*Ammonia Nitrogen Content based on weight uncarbonized wool %*	*Total Nitrogen based on wgt. of carb. & neut. wool %*	*Total Protein accounted for by Total N using factor of 6.1 %*	*Total Wool accounted for from actual wool weight %*
Uncarboni.ed Wool		0.783	16.39			100.0	100.00
Carbonized and Neut. Wool.....		0.730	15.27		15.61	95.2	98.12
Combined Neut. Solutions	0.0249	0.037	0.77	0.522		4.7	1.88

When such carbonized wool is rinsed in water the soluble "wool-substance-acid reaction product" having the higher acid content, is largely removed, leaving very little acid for removal by chemical neutralization.

The carbonizing hydrolysis is a progressive affair and repeated carbonizing of the same wool sample results in further protein loss. For example, a sample of wool treated with 5% H_2SO_4 and dried 12 minutes at 280°F., lost 4.75% of its weight in neutralizing. When the entire process was repeated on the same sample, an additional loss of 3.30% was found. A third carbonization of this sample resulted in a 2.49% loss.

Summary

From the standpoint of the commercial processor, data offer a clue to reducing significant losses of soluble wool substance. Careful control of operating conditions is necessary if wool damage is to be minimized. Proper manufacturing facilities are, of course, also necessary if effective carbonization of vegetable matter is to be accomplished while minimizing the wool loss.

It would seem that future work along the lines of this investigation might include such considerations as the following:

1. An examination of the amino acid content of the substance removed in neutralizing subsequent to carbonizing.

2. A correlation of the loss of wool-substance with other means of detection of damage.

3. A study of wool loss resulting from a given carbonizing system vs. micron grade of wool ranging from coarse to fine.

References

(1) Eavenson & Creely, "Am. Dysetuff Reptr." *25*, 719 (1936).

(2) Harris, "Bur. of Standards Jour. of Res." *12*, 480 (1934).

(3) Ryberg, "Am. Dyestuff Reptr." *27*, 8 (1938).

(4) Haller, "Am. Dyestuff Reptr." *30*, 221 (1941).

(5) Caldwell, "Organic Chemistry", "Houghton Mifflin Co.", 381 (1943).

(6) Sahyun, "Outline of Amino Acids and Proteins", "Reinhold Pub Co.," 88 (1948).

(7) Steinhardt and Fugitt, "Bur. of Standards Jour. of Res." *29*, 324 (1942).

Discussion

Mr. Wollner: I think this is an interesting presentation of a most debatable subject, representing, as you know, millions of dollars in duty a year to the woolen industry. I think it is an important subject that has long been in need of investigation.

I would like to ask whether you ran any parallel tests on the recovery of protein on wool which had been treated with ammonia solely and after baking, but in the absence of acid.

Then I would like to know whether anything has been done with the other carbonizing chemicals which are at times employed, or whether such work is contemplated.

Mr. Bauer: In this case there were one or two control tests run with ammonia used as a neutralizing agent, but on which there had been no carbonizing operation. There was no significant loss in anything except ash and extractibles, which of course would accompany any wet processing.

It is impossible to put wool in water without reducing its ash and extractibles to some extent, and the more successive baths that are employed for that purpose, the further the ash and extractibles are reduced. I do not know any one who has ever attained wool with zero per cent ash and zero per cent extractibles.

With regard to your second question, the title of the paper, you will note, was "The Occurrence of Soluble Wool-Substance as a Result of the Sulfuric Acid Carbonizing Process." For the purpose of this paper, no other work is being reported except the results of the sulfuric acid carbonizing process.

Mr. Buxbaum: Which of these three factors controlling the loss is considered the most important, acidity, time, or emperature of drying? What is the relative importance of each from the standpoint of the loss of weight?

Mr. Bauer: That is rather a difficult question to answer. We showed on the graphs that as drying temperature increased, the loss of wool-substance as a result of solubilization also increased. We showed that as the sulfuric acid concentration of the bath increased, the loss also increased, and we also showed that as a result of increased drying time the loss increased.

To answer that question you must select a point common to each of the three curves. Unfortunately, only one such point

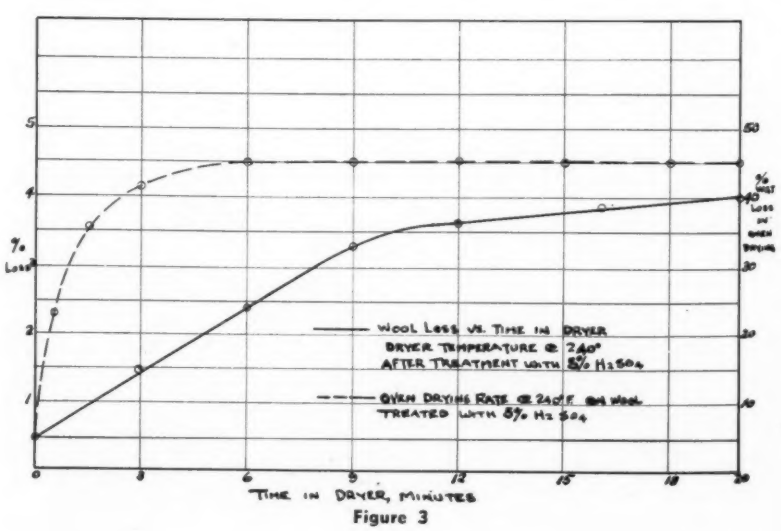

% Loss
% Wool Loss in Oven Drying
WOOL LOSS VS. TIME IN DRYER
DRYER TEMPERATURE @ 240°
AFTER TREATMENT WITH 5% H2SO4
OVEN DRYING RATE @ 240°F ON WOOL
TREATED WITH 5% H2SO4
TIME IN DRYER, MINUTES

Figure 3

appears on each graph, viz. 5% H_2SO_4, 12 minutes in the dryer at 240°F. At this point it will be seen that, to obtain 1% more wool yield, it would be necessary to reduce the acid concentration by 1% or the dryer air temperature by about 25°F. or the time in the dryer by about 5 minutes.

Mr. Tucker: In Figures 1, 2 and 3, the losses of wool are graphed without correction for the reduction in ash and extractibles. Why was that done?

Mr. Bauer: The purpose of graphing the figures that way was that the processer is generally concerned with overall loss, and the charts were illustrated from that standpoint. The processer is not concerned primarily in whether his loss of wool is protein, ash, extractibles, or what it is; he is only concerned that there is a loss. So we have shown these charts giving the overall loss figures rather than the loss of protein matter alone.

In Table 7, the last column showed what the losses would have been, corrected for the change in ash and extractables.

Mr. Rosenberger: In Table 2, the neutralized wool showed a gain in both ash and extractibles, whereas in Table VII the neutralized wool showed losses. How is that accounted for?

Mr. Bauer: This is accounted for in two ways. First of all, in Table II tests for extractibles were made which, as I pointed out, also remove some wool-substance. And although many wool men erroneously refer to them as "grease tests," they show no such thing at all. They give a variety of things in the extract. In Table VII, one reason the figures were lower was that the carbon tetrachloride method was used which is more specific for grease alone. Another reason was that much more complete extraction of wool-substance was accomplished in determining the neutralizing losses recorded in Table VII than in Table II.

Mr. Flynn: Is there a loss of tensile strength conceded in carbonizing?

Mr. Bauer: No, a loss of tensile strength is not necessarily conceded in carbonizing. In previous work by many authors, it has been shown that there may be no significant loss in tensile strength in a well regulated process and yet there may be a modification of the wool which would result, for example, in the carbonized wool having increased amino nitrogen.

That work, I think, has been reported quite thoroughly by Harris and his coworkers, although, of course, any significant damage or modification would also be accompanied by some loss in tensile strength.

Mr. Wollner: Would that last statement of yours imply that lack of control during carbonizing would result in loss of tensile strength?

Mr. Bauer: I believe that is true. Carbonizing conducted under conditions of poor control would certainly result in loss in tensile strength. However, we are talking specifically about tensile strength, and the factor of elasticity is not being considered. It is possible to keep the same tensile strength, and have a reduction in elasticity.

Tests have been run on tensile strength of certain carbonized wools which showed that no loss of fibre strength occurred, even though when those wools were put through a worsted card there was a definite shortening of staple length. Of course, the reason is attributed to a combination of circumstances which would include the extensibility of the fiber along with tensile strength.

Mr. Mooradian: Your first slide showed the loss of wool-substance for commercially carbonized wool to be about 2.38 per cent. In a subsequent slide you showed the loss of wool-substance for laboratory carbonized wool to be much higher. How do you account for this difference?

Mr. Bauer: I think the reason was that in the first slide, made on commercially carbonized wools, the tests were principally of coarse wools. There were only two examples of fine wools; the rest were all coarse wools. The fine wools, you will recall, showed a higher loss than did the coarse wools even though they were included in that average.

The fine wools probably would exhibit a greater loss under a given set of carbonizing conditions than would coarse wools.

Mr. Reider: Did you attempt to analyze your wools for alkali content after washing with ammonia, and more important, with soda ash? And if you did, what method did you use?

I am particularly interested in the wools where you report zero per cent solubility.

Mr. Bauer: You must remember that in a very short immersion period, equilibrium is not reached. Since these samples were processed in such a way as to simulate the commercial continuous operation where time is very limited for wool passing continually through a neutralizing bath, the wools were not allowed to remain in the alkali until equilibrium was attained. Therefore, though the bath may have been alkaline, the wool had not yet reached anywhere near the pH of the bath.

Mr. Reider: Did you test it for alkali?

Mr. Bauer: Yes. As a matter of fact, I think one indication of that was given in the tables. We showed the pH of the wool both before and after the alkaline treatment.

Mr. Reider: What method did you use for testing the alkali content?

Mr. Bauer: We did not use a determination for total alkali; we tested the wool for its pH and considered the alkali as zero when the pH of the wool reached 7.0.

Mr. Mandolier: The point was raised as to how much ash and extractibles could be considered part of the wool rather than extraneous matter. Have any standards been established for the ash or extractibles content of clean wool?

Mr. Bauer: The question is still open as to how much ash and extractibles are considered part of the wool substance itself. However, as most of you know, there have been some figures established for what is defined as the "clean content" of wool. In the clean-content definition set forth by the U. S. Treasury Department in the Customs regulations and used by the U. S. Department of Agriculture, many testing agencies in the country, and A.S.T.M., the ash content provision for wool is 0.5 per cent and the alcohol extractibles 1.5%

However, in view of the fact that the alcohol extractibles include some wool substance, I think this standard is open to some debate.

In addition we have accumulated evidence that the average ash and extractibles content of carbonized and neutralized wools is always significantly lower than that of wools which have been only scoured.

EMPLOYMENT REGISTER

Further information can be obtained from the Secretary of the Association, Lowell, Textile Institute, Lowell, Mass.

50-2

Education: New Bedford Textile Institute.
Experience: 16 years chemist, dyer and superintendent, cotton and rayon dyeing and finishing.
Age 40; married; references; position as superintendent or demonstrator in eastern U. S. preferred.

2-6, 2-20

50-3

Education: Evening and correspondence school courses in accounting, chemistry & dyeing, textile design and manufacturing.
Experience: 31 years laboratory technician and laboratory director in spinning mill.
Age 46; married; references; position in New England preferred.

2-20, 3-6

50-4

Education: Technical school, silk finishing.
Experience: 31 years superintendent of finishing.
Age 51; widower; vicinity of New York preferred.

2-20, 3-6

MOISTURE DETERMINATIONS IN WOOL*

Forum Held by

NORTHERN NEW ENGLAND SECTION

THE Northern New England Section held a forum on the subject of "Moisture Determinations in Wool" on Friday afternoon, November 4, 1949, at Lowell Textile Institute, preceding the dinner meeting. John M. Gould, Plant Chemist, Barre Wool Combing Co., Ltd., South Barre, Mass. acted as moderator before an audience of about 50 mill chemists, research chemists and students.

Mr. Gould reviewed the present practices and methods of moisture determination and discussed the scope of these. He pointed out that moisture testing falls into three general classifications: (1) Testing as part of research studies (2) Testing for accounting purposes (3) Testing for plant control. He added that, while the drying oven is most generally used today, the electronic moisture testers and the distillation method of determining moisture content have been applied in some cases.

Hugh Christison, Chief Chemist, Arlington Mills, Lawrence, Mass., was asked to discuss the distillation method of moisture-content determination. He stated that this method actually measures the amount of water on the material whereas the oven method measures the loss in weight of the sample. The loss in weight as determined by the oven method comprises all volatile substances, including fiber lubricants of the ester type, which are also volatile.

Mr. Christison thought that the distillation procedure is most accurate for actually measuring amounts of water but that the solvents considered most satisfactory are hazardous because of their flammability. The solvent he favors is octane, which boils at 110°C. and is less subject to emulsion in the water trap. Because of this he concluded that the so-called forced-draft and Emerson ovens are more satisfactory for plant control, but for accounting purposes the distillation method is more accurate for top and yarn. A discussion followed regarding the respective merits of the forced-draft type and Emerson ovens. Some contended that while the forced draft oven provides more rapid results than the Emerson oven on a small number of samples, the Emerson oven is faster when a large number of tests are to be made at one time. Another argument in favor of the conventional Emerson oven for testing a large number of samples is the availability of the operator's time for other laboratory testing while samples are drying.

A general discussion of ovens and of sample sizes brought out the fact that the 10-gram sample used in some ovens gives accurate results. Various ideas for improving ovens were considered, including that of using dry air for the final few tenths of a percent. Mr. Christison believed that if the direction of the air is reversed and the air is directed down on the sample instead of upward, more effective drying results. It was agreed that to avoid fairly large errors the hot sample should be weighed in the oven. It was pointed out that a wide range of temperatures from 105°C. to 150°C. is in use in various ovens.

The Carl Fischer method was discussed, but apparently not enough work has been done with the method in this area for its value and limitations to be definitely stated.

Frank O'Neil, Director of Physical Research, Pacific Mills, Lawrence, Mass. gave his opinion on electronic apparatus for moisture testing and stated there is yet disagreement as to which make is most successful. From results of work carried out in his laboratory, he expressed the opinion that no single instrument can be universally used but that careful study must be made to determine the value of each in various cases. The usefulness of each type is dependent upon the condition of the material under test. The pH oil content, and the temperature of the room will often produce errors in the results unless careful control is maintained or corrections are made. The precision is ±5% in moisture content (wool stock), when the instruments are properly calibrated and used.

The use of dielectric heating elements was discussed briefly and comments were offered indicating that the use of such devices is as yet experimental. Mr. Christison stated that the symmetry of the sample is an important factor in the accuracy of the result. Mr. O'Neil added that with most installations it has been difficult to avoid burning of the stock during the final stage of drying.

There was mentioned briefly the "sword" type instrument which measures the relative humidity of the air in equilibrium with the fibers. These are widely used in paper industry but not in worsted textile mills.

Alan Claflin spoke on the efficiency of various types of "forced-draft" dyers with which he is familiar.

* Presented at meeting, Northern New England Section, November 4, 1949.

CALENDAR

COUNCIL
Meetings: June 9 (Montreal, Que.) Sept. (Portsmouth, N. H., Convention) Nov. 17 (New York).

NATIONAL CONVENTIONS
1950: September 28 to 30, Portsmouth, N. H.
1951: October 18 to 20, Statler, New York
1952: Boston.

MID-WEST SECTION
Meeting: May 6 (Schroeder Hotel, Milwaukee, Wisc.).

NEW YORK SECTION
Meetings: Mar. 3 (Hotel Statler, New York), April 14, May 5 (Kohler's Swiss Chalet, Rochelle Park, N. J.), June 16—Outing.

NORTHERN NEW ENGLAND SECTION
Meeting: March 24 (Mass. Inst. of Technology, Cambridge, Mass.)

PHILADELPHIA SECTION
Meetings: February 24, March 31, May 5 (Kugler's, Philadelphia), June 9 (Annual Outing, Torresdale Country Club, Philadelphia), October 13, December 8, January 17, 1951.

PHILADELPHIA TEXTILE INSTITUTE STUDENT CHAPTER
Meetings: March 1, March 29, April 26, and May 24.

PIEDMONT SECTION
Meetings: April 1 (Robert E. Lee Hotel, Winston-Salem, N. C.), June 30-July 1 (Ocean Forest Hotel, Myrtle Beach, S. C.).

RESEARCH COMMITTEE
Meetings: June 9 (Montreal, Que.) Sept. (Portsmouth, N. H., Convention) Nov. 17 (New York).

RHODE ISLAND SECTION
Meeting: Feb. 24 (Johnson's Commodore Room, Providence, R. I.).

SOUTHEASTERN SECTION
Meetings: Feb. 25 (Talladega, Ala.), May 27 (Columbus, Ga.), Sept. 23 (LaGrange, Ga.) Dec. 9 (Atlanta, Ga.)

WESTERN NEW ENGLAND SECTION
Meetings: March 10 (Waterbury, Conn.), April 14 (Rapp's Restaurant, Shelton, Conn.) May 26 (Waverly Inn, Cheshire, Conn.) June 23 (Outing at Wallingford, Conn. Country Club).

—♦ ♦—

February 24th Dinner Meeting, Rhode Island Section

A DINNER meeting of the Rhode Island Section will be held at Johnson's Commodore Room, Allens Ave., Providence, on Friday, February 24th. A social hour, from 6 to 7 P.M., will precede the dinner. Speakers for this meeting are:

Edward H. Gamble, E. I. du Pont de Nemours & Co., Inc., "Conditions in the Textile Industry in Europe".

S. Ramsay Hamilton, "A Scotchman Looks at American Industry".

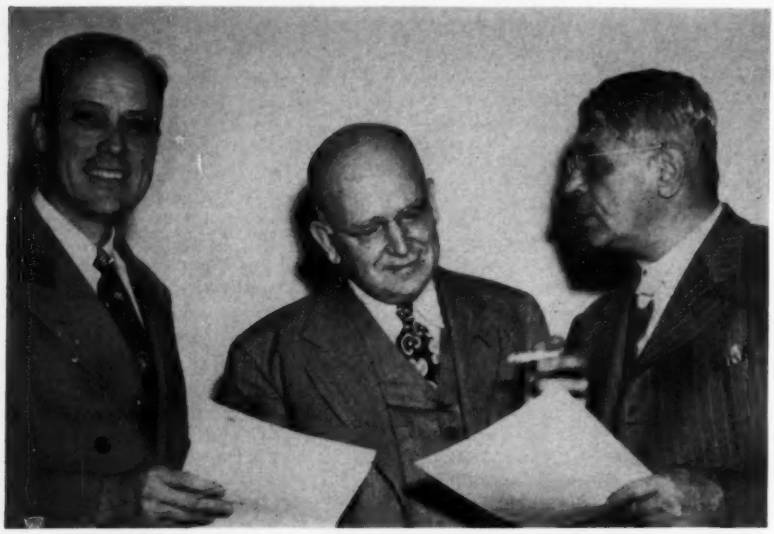


Photo by Kenneth Everett

Dr. Lloyd D. Barrick, Elliot Broadbent, Dr. Julius Pfannmuller

Barrick, Pfannmuller, Speak at R. I. Section Meeting

A MEETING of the Rhode Island Section was held on January 27th at 8:00 P.M. in the Providence Engineering Society Hall. Speakers were:

Dr. Lloyd D. Barrick, Chemical Director of the Dye Department, Arnold, Hoffman & Co., "Constitution of Vat Dyes versus Printing Performance and Other Properties".

Dr. Julius Pfannmuller, Chief Chemist, Wallerstein Company, "The Application of Enzymes in Textiles".

Elliot Broadbent, Section Chairman, presided.

—♦ ♦—

Philadelphia Section Meeting Report

A MEETING of the Philadelphia Section was held at Kugler's Restaurant in Philadelphia on January 13th, 1950.

James Dixon, 1949 Philadelphia Section Chairman, opened the meeting by thanking the men who had served with him during his term. He then introduced Richard B. Stehle as 1950 Chairman.

Mr. Stehle presented Mr. Dixon with a Hamilton wrist watch on behalf of the Section.

James Grey was welcomed back after a long illness.

Chairman Stehle announced his selection of Committee Chairmen. (This list appeared on page P64 of the January 23 issue, ADR).

The 1949 Auditing Committee under Prof. Theel, reported on the financial status of the Section, and reported it in good condition.

A film on the 1949 Annual Convention in Atlantic City was shown by George Altenbaumer of Fred Whitaker Co.

Harry L. Morgan, Chairman of the Program Committee declared the technical session in honor of the Intersectional Contest Committee. The various members were introduced, and then Jackson A. Woodruff, Chairman of the Intersectional Contest Committee, presented the paper given at the 1949 Annual Convention in Atlantic City, entitled "Dimensional Changes Occurring in Spun Viscose Rayon Fabrics During Finishing Operations on Machinery used for Obtaining Shrinkage Stabilization". A question period followed.

152 members and guests attended the dinner preceding the meeting, with 165 at the technical session.

Respectfully submitted,
THOMAS H. HART, *Secretary.*

—♦ ♦—

Report of Piedmont Winter Meeting

THE Winter Meeting of the Piedmont Section was held at the Poinsett Hotel, Greenville, South Carolina on Saturday, January 21, 1950.

A luncheon and business meeting was attended by officers of the Section at 1:00 P.M. Among the things discussed were ways and means of making Student Chapters at Clemson and North Carolina State more active. It was decided that student members would be admitted to future banquets at reduced rates. The Spring Meeting of 1951 will be held at North Carolina State College in Raleigh. The Myrtle Beach Outing was discussed and money appropriated for ladies' prizes.

The technical session started at 3:00 P.M. and the first speaker was Graham Fisher of E. F. Drew Company, who gave a paper on "Operating a Piece Goods Dyehouse". The second paper was on the subject of "Resin Finishing of Cotton Piece Goods" by Dr. Ralph Nickerson of Monsanto Chemical Company. This was followed by a discussion period. Thomas W. Kitchen of Rodney Hunt Machine Company presided at the Technical Session.

The banquet speaker was Dr. Nicholas P. Mitchell, writer and news commentator, whose subject was "What Can a Man Believe?" Approximately 150 members attended the meeting.

Respectfully submitted,
W. CHESTER COBB, *Secretary.*

—♦ ♦—

Northern New England March Meeting

THE Northern New England Section will hold their March meeting at the Massachusetts Institute of Technology on the 24th.

An informal round-table discussion on "Sampling for Quality Control and Research" will take place at 4:00 P.M. Prof. Edward R. Schwarz will moderate and will be assisted by several members of the Institute staff.

Dinner is scheduled for 6:15.

The evening program will feature Lance Rees, Technical Director of Manton Gaulin Manufacturing Co., Inc., Everett, Mass. and Paul J. Martin of Socony-Vacuum Laboratories, Brooklyn, N. Y.

Mr. Rees will present a paper on "Starch Conversion by Homogenization".

Mr. Martin will speak on "Problems in the Development of Efficient Woolen Fiber Lubricants".

—♦ ♦—

Report of Western New England Section Meeting

THE Western New England Section held a meeting on January 27, 1950 at Rapp's Restaurant, Shelton, Connecticut. Approximately fifty members and guests were present.

Paul J. Martin of the Socony-Vacuum Laboratories gave a talk on the test methods for evaluating wool lubricants and the results of pilot plant investigations.

Respectfully submitted,
ARTHUR S. NYQUIST, *Secretary.*

Membership Applications

ASSOCIATE

Erma A. Hinek—Supervisor of Tech. Files, Consumers' Research Inc., Washington, N. J.

Edward J. Kenney—Director of Labs., York Research Corp. of Connecticut, Stamford, Conn.

Richard E. Knopf—Tech. Salesman, Dow Corning Corp., Atlanta, Ga.

Tulio B. Piana—Director, Mfr. de Tejidos de Lana del Pacificio S. A., Lima, Peru.

Ivica Pollak—Amalgamated Chemicals & Dyestuffs Co., Ltd., Bombay, India.

Howard C. Royce—Vice-President in charge of Sales, Royce Chemical Co., Carlton Hill, N. J.

Eduardo V. Spencer—Dyeing Master, Fcas. Textiles Caupolican-Chiguayante S. A., Renca Mill, Santiago, Chile.

Alan H. Todd—Asst. Finishing Dept. Mgr., Dominion Woolens & Worsteds, Ltd., Hespeler, Ontario, Canada.

JUNIOR

Edward W. Boland—Laboratory Tech., Alexander Smith & Sons Carpet Co., Yonkers, New York. Sponsors: E. A. Leonard, A. G. Ashcroft.

William T. Bueltman—Laboratory Tech., Alexander Smith & Sons Carpet Co., Yonkers, New York. Sponsors: E. A. Leonard, A. G. Ashcroft.

Fred R. Cloos—Quality Control, Greenwood Mills, Inc., New York, N. Y. Sponsors: G. A. Urlaub, S. I. Van Vliet.

William J. Dickey, Jr.—Laboratory Asst., Bibb Mfg. Co., Macon, Ga. Sponsors: J. C. Sheehan, C. Mueller.

Byron H. Drummond—Laboratory Asst., Franklin Process Co., Providence, R. I. Sponsors: R. W. Joerger, E. K. Johnson.

Howard V. Hadfield—Chemist, Sayles Finishing Plants Inc., Saylesville, R. I. Sponsors: P. J. Ariente, H. C. Allen.

Frank G. Hewit—Text. Resin Salesman, American Cyanamid Co., Bound Brook, N. J. Sponsors: R. M. Fischer, L. A. Fluck, Jr.

John F. Kneeland—Salesman, Arnold, Hoffman & Co., Inc., Providence, R. I. Sponsors: J. M. Washburn, Jr., H. C. Wood.

Richard E. Milana—Salesman, American Aniline Products, Inc., New York, N. Y. Sponsors: J. J. Marshall, L. J. Dogin.

Robert J. O'Brien—Production Mgr., R. W. Bates Piece Dye Works, Garnerville, New York. Sponsors: T. F. O'Brien, J. Niewaroski.

John J. Osmar—Chemist, Mellon Institute of Industrial Research, Pittsburgh, Pa. Sponsors: C. R. Barnes, A. W. Harvey.

John C. Picken—Dyer, Goodall Sanford, Inc., Sanford, Maine. Sponsors: T. W. Shoesmith, W. E. Schmottlach.

Marion H. Randolph, Jr.—Burlington Mills, Altavista Finishing Plant, Altavista, Virginia. Sponsors: J. P. Franklin, W. Knoepfel, Jr.

James Theodosopoulos—Text. Chemist, Manchester Finishing Plant of Textron, Inc., Manchester, N. H. Sponsors: A. M. Zimmerman, A. C. McDonough.

Ralph F. Turner, Jr.—Sales Repres., Rumford Div., Heyden Chemical Corp., Rumford, R. I. Sponsors: A. H. Razee, I. G. Loxley.

William Wald—Sales Trainee, Text. Chem. Dept., Rohm & Haas Co., Philadelphia, Pa. Sponsors: H. F. Lawton, C. M. Clevenger.

Charles E. Williams—Asst. Dyer, Williams Dyeing Co., Paterson, N. J. Sponsors: C. A. Heydon, G. R. Decnyf.

STUDENT

Donold P. Feyler—Lowell Textile Institute. Sponsor: E. E. Fickett.

Irving W. Feyler—Lowell Textile Institute. Sponsor: E. E. Fickett.

Salomon Heisler—Massachusetts Institute of Technology. Sponsor: E. R. Schwarz.

David B. Groves—New Bedford Textile Institute. Sponsor: Francis Tripp.

Andrew J. Mignerey—New Bedford Textile Institute. Sponsor: Francis Tripp.

John S. Bruce—Institute of Textile Technology. Sponsor: George H. Coleman.

Malcolm A. Sanborn—Institute of Textile Technology. Sponsor: George H. Coleman.

Osman N. Arslan—North Carolina State College. Sponsor: Henry A. Rutherford.

Charles F. Donyes—North Carolina State College. Sponsor: Henry A. Rutherford.

Harris E. Rubin—North Carolina State College. Sponsor: Henry A. Rutherford.

Francis A. Flynn—Bradford Durfee Technical Institute. Sponsor: James Watters.

Henry M. Linz—Bradford Durfee Technical Institute. Sponsor: James Watters.

Joseph E. Bresnahan—Georgia Institute of Technology. Sponsor: C. A. Jones

James O. Hammond—Georgia Institute of Technology. Sponsor: C. A. Jones

Daniel A. Jewell, IV—Georgia Institute of Technology. Sponsor: C. A. Jones.

Myron Walker—Georgia Institute of Technology. Sponsor: C. A. Jones.

Bill J. Wright, Jr.—Georgia Institute of Technology. Sponsor: C. A. Jones.

Walter T. Ambrogi, Jr.—Philadelphia Textile Institute. Sponsor: P. Theel.

Ralph Baldecchi—Philadelphia Textile Institute. Sponsor: P. Theel.

Edward A. Chwatt—Philadelphia Textile Institute. Sponsor: P. Theel.

Harris W. Cohen—Philadelphia Textile Institute. Sponsor: P. Theel.

Alfred W. Cowan—Philadelphia Textile Institute. Sponsor: P. Theel.

Louis R. Croce—Philadelphia Textile Institute. Sponsor: P. Theel.

James C. Grifo—Philadelphia Textile Institute. Sponsor: P. Theel.

Wolf Grunberg, A.—Philadelphia Textile Institute. Sponsor: P. Theel.

Fred L. Hartman—Philadelphia Textile Institute. Sponsor: P. Theel.

Frederick B. Hennessey—Philadelphia Textile Institute. Sponsor: P. Theel.

Walter E. Kramer—Philadelphia Textile Institute. Sponsor: P. Theel.

David Leshin—Philadelphia Textile Institute. Sponsor: P. Theel.

Alan H. Lightkep—Philadelphia Textile Institute. Sponsor: P. Theel.

David S. Linz—Philadelphia Textile Institute. Sponsor: P. Theel.

Philip Martell—Philadelphia Textile Institute. Sponsor: P. Theel.

Samuel J. Rexon—Philadelphia Textile Institute. Sponsor: P. Theel.

William T. Roff—Philadelphia Textile Institute. Sponsor: P. Theel.

Harry A. Roselle—Philadelphia Textile Institute. Sponsor: P. Theel.

Jerome Rosenfeld—Philadelphia Textile Institute. Sponsor: P. Theel.

Tremone G. Rudman—Philadelphia Textile Institute. Sponsor: P. Theel.

John I. Weierman—Philadelphia Textile Institute. Sponsor: P. Theel.

Oliver P. Stroup—Philadelphia Textile Institute. Sponsor: P. Theel.

Donald W. Treimann—Philadelphia Textile Institute. Sponsor: P. Theel.

Applications for Transfer to Senior Membership:

Dennis W. Bruce, Samuel Lee, William C. Privette.

Application for Corporate Membership: Naumkeag Steam Cotton Company, Salem, Mass.

—♦ ♦—

S. E. Section to Meet Feb. 25

THE Southeastern Section will hold its first 1950 meeting in Talladega, Alabama on Saturday, February 25. The technical session will be held in the auditorium of the Alabama Power Company at 4 P.M. Dr. Leonard E. Ravich, Vice President in Charge of Research, Vat-Craft Corporation, will discuss the new process for vat dyeing fabrics photochemically by the use of a radio-active source material UA-1.

The banquet will be held at 7:30 P.M. in the Purefoy Hotel, and will be followed by the General Electric film, "Textiles Unlimited."

All members have been invited to inspect the new package dye plant of the Wehadkee Yarn Mills before the meetings begin.

ANNUAL MEETING AND CONVENTION

•

September 28-29-30, 1950
Wentworth-by-the-Sea
Portsmouth, New Hampshire

•

Auspices of
RHODE ISLAND SECTION

LAPEL BUTTONS
for
AATCC MEMBERS

•

These buttons bear the Seal of the Association and may be purchased by members in good standing from the National Secretary at $2.00 each.

•

DR. H. C. CHAPIN
LOWELL TEXTILE INSTITUTE
LOWELL, MASSACHUSETTS

COLOUR INDEX

SECOND EDITION

The A.A.T.C.C. *Colour Index* Committee now working on the second production of the *Colour Index* would welcome information on errors which readers have noticed in the first edition.

Please address all communications to:

WILLIAM H. CADY
127 POWER STREET, PROVIDENCE 6, R. I.

ABSTRACTS

Symposium on Photochemistry in Relation to Textiles

Journal of the Society of Dyers and Colourists, December, 1949.

The December issue of the *Journal of the Society of Dyers and Colourists* consists of the papers which were presented at the Society's fourth symposium on "Photochemistry in Relation to Textiles," held September 22-24, 1949. The author's abstracts are reprinted herewith.

Spectral Characteristics of Light Sources for Fading and Degradation Testing

B. S. Cooper and F. S. Hawkins, Journal of the Society of Dyers and Colourists, page 586, Vol. 65, No. 12, December, 1949.

The spectral distribution of energy in the visible and ultra-violet regions has been measured for the enclosed carbon arc commonly employed in fading test apparatus. Tests have been made on both D.C. and A.C. arcs, and the effect of electrical loading, asymmetrical polar distribution, and obscuration of the enclosing globe has been investigated. Certain data are also presented for the high-intensity carbon arc and for three types of metal-vapor electric discharge lamp likely to be suitable for photochemical work. Comparison is made with incandescent tungsten sources and with sunlight for corresponding spectral regions.

The Photochemistry of Aromatic Azo Compounds in Organic Solvents

B. Edwin Blaisdell, Journal of the Society of Dyers and Colourists, page 618, Vol. 65, No. 12, December, 1949.

Qualitative observations have been made on the photochemistry of azobenzene and 4-amino-4'-nitroazobenzene solutions in *iso*propyl alcohol and *iso*octane in the presence of various amounts of oxygen. The fading reaction consists in the addition of hydrogen, extracted from the solvent, to the azo linkage to form a substituted hydrazine and later substituted anilines.

In the presence of oxygen there is a photosensitized oxidation of the solvent. In *iso*propyl alcohol as solvent the fading of the dye is completely inhibited by one atmosphere of oxygen, but after exhaustion of the oxygen the dye fades very rapidly. In the presence of a large excess of oxygen the dye eventually fades slowly. The rate of oxygen consumption increases during the exposure and continues to increase after complete destruction of the dye. In this case the oxidation products contain aliphatic acids and carbon dioxide in addition to acetone. The number of carbonyl groups produced is in excess of equivalence to the molecular oxygen consumed.

The Quantitative Measurement of Light Fastness

T. Vickerstaff and D. Tough, Journal of the Society of Dyers and Colourists, page 606, Vol. 65, No. 12, December, 1949.

The conditions and criteria of light fading tests are reviewed. It is suggested that greater precision could be obtained by closer control of fading conditions including photo-electric measurement of light exposure, together with improved methods of assessing color change in terms of the number of just noticeable differences of color from the original shade.

The Action of Light on Dyes

E. J. Bowen, Journal of the Society of Dyers and Colourists, page 613, Vol. 65, No. 12, December, 1949.

Excited singlet levels of dye molecules formed by absorption of light may pass to triplet or "diradical" levels, which may be chemically more reactive. Many of the photoreactions of dyes have been formally intrepreted as "electron transfer" reactions, but details of the process are usually obscure, especially in regard to the relative parts played by the singlet and triplet levels, the states of ionization of the radicals formed, and the intervention of reactive species such as O_2, HO_2, and OH. It is suggested that experiments to bring out the properties fo the triplet levels would be helpful for further understanding of dye photoreactions.

The Practical Assessment of the Light Fastness of Dyeings

T. H. Morton, Journal of the Society of Dyers and Colourists, page 597, Vol. 65, No. 12, December, 1949.

The testing of light fastness of dyeings against standards such as those originated by the Society is considered. It is shown that in practice certain anomalies are found, since the sample and dyeing do not necessarily follow the same course of fading. The discrepancies are examined on the basis of simple theory, and certain recommendations are made in respect of the practice of light-fastness testing. The influence of quality of light, atmosphere, and mixture of dyes is discussed.

Some Studies of the Fading of Simple Monoazo Dyes

E. Atherton and I. Seltzer, Journal of the Society of Dyers and Colourists, page 629, Vol. 65, No. 12, December, 1949.

The fastness, on exposure to the light from a carbon arc, of a series of simple monoazo dyes in cellulose acetate film has been measured. A relationship is proposed between the chemical constitution and the order of light fastness of these dyes. The light fastness of each dye has been characterized by a destruction efficiency constant. In defining this quantity, account has been taken of the specific absorbing powers of the dyes for the heterochromatic light used to fade them. Special precautions have been taken to standardize exposures by means of a light flux-time integrator.

The Oxidation of Azo Dyes and its Relation to Light Fading

N. F. Desai and C. H. Giles, Journal of the Society of Dyers and Colourists, page 639, Vol. 65, No. 12, December, 1949.

It has been shown that oxidation of azo dyes in aqueous media, with several common reagents, including ceric sulfate, potassium dichromate, and hydrogen peroxide, disrupts the azo group and leads to the formation of a diazo compound and a quinone. Subsequently, these further decompose to give, respectively, a phenol and nitrogen (in acid media) and phthalic acid. This reaction thus appears to be common to many types of oxidizing agent, since previous workers have observed like effects with, e.g., hypochlorite, lead dioxide, and nitric acid. An acceptor has been used to characterize the quinone formed. By boiling the acid solution after oxidizing the dye a quantitative yield of nitrogen from the azo group is obtained, except when the free amino groups are also present.

A hypothesis is put forward suggesting that the initial step in such chemical oxidations is one of hydrolytic attack on the -C=N- bond of the hydrazone tautomer of the dye. This is shown to fit the facts reasonably well by a study of the relative ease of oxidation of several phenylazo

dyes of both soluble and insoluble types, with different substituents in the benzene ring.

An examination of available light fading data shows evidence of agreement with this theory in the case of insoluble azo dyes, but soluble dyes in many cases behave in an opposite sense.

It seems unlikely that a chemical reagent can be found to fade dyes in the same manner as light exposure and thus be suitable for a rapid sorting test.

Some Experimental Observations on the Photochemical Degradation of Dyed Cotton

D. Ashton, D. Clibbens, and M. E. Probert, Journal of the Society of Dyers and Colourists, page 650, Vol. 65, No. 12, December, 1949.

The photochemical oxidation of cotton by the air is sensitized by sulfur and basic dyes, as well as by vat dyes. As with vat dyes, so too with sulfur dyes, there is a correlation between the color of the dye and its sensitizing action. With the basic dyes there is no such relation between color and sensitizing action. The only direct dye so far observed to accelerate the photochemical oxidation is the thiazole dye Primuline. The introduction of the azo group into the Primuline molecule by oxidation, or by diazotizing and coupling, diminishes or destroys its photochemical action.

Very small amounts of copper may exert a large effect on the photochemical action of all classes of dyes. The effect is a complicated one, but its net result is to diminish greatly the sensitizing action of the most active dyes.

Many dyes liberate hydrogen peroxide on irradiation in moist air, but this action is prevented by the presence of small amounts of copper and of some other metals.

There is a strong positive correlation between the liberation of peroxide by a dye on irradiation and its accelerating effect on the photochemical oxidation. The accelerating sulfur dyes do not, however, liberate detectable amounts of peroxide on irradiation.

The Action of Light on Cellulose Dyed with Vat Dyes

A. Landolt, Journal of the Society of Dyers and Colourists, page 659, Vol. 65, No. 12, December, 1949.

The tendering activity of thirty-eight vat dyes has been examined by various tests, and an attempt made to discover from the constitutions of the dyes which substituents are responsible for tendering or nontendering properties.

It is found that most of the anthraquinone-carbazole dyes tested are non-tendering. The tests on other groups of dyes show that certain substituents appear to exert a tendering influence and others a protective action. It seems that the simpler chemical compounds of the vat dye series have an inherent tendering action, which is repressed or enhanced by the nature and orientation of the substituents and the resulting configuration. It therefore seems unlikely that any general rule of tendering based on the chemical constitution of the dyes can be given.

A difficulty in estimating the relation of constitution to tendering is the impossibility of comparing dyes of different light absorption, since the light energy depends on the wavelength.

It is also found that both oxidation and reduction phenomena can be brought about by irradiating cotton dyed with vat dyes. This result confirms earlier suggestions that the tendering reaction may be caused by a succession of reducing and oxidizing processes.

Photosensitization and Tendering by Vat Dyes

C. H. Bamford and M. J. S. Dewar, Journal of the Society of Dyers and Colourists, page 674, Vol. 65, No. 12, December, 1949.

The relative activities of a number of vat dyes have been compared for the following photosensitized reactions—*(a)* tendering of viscose, *(b)* autoxidation of tetralin, *c)* polymerization of styrene, and *(d)* deactivation of the excited dyes by oxygen.

The tendering activities show no correlation with *(c)* or *(d)* but show a moderate correlation with *(b)*. It is concluded that the tendering of cellulose in the presence of water involves a preliminary oxidation of hydroxyl ion by the excited dye, and not a transfer of energy to oxygen as Egerton has postulated. The main tendering action involves hydrogen peroxide as an intermediate, in agreement with Egerton. The detailed mechanism is discussed.

The tendering of dry cellulose, or of nylon, silk, or cellulose acetate, probably involves nonchain oxidations of the fabrics by the excited dyes. A mechanism is postulated which accounts for the nonformation of hydrogen peroxide in the absence of moisture.

The quantum yield and the intensity exponent in the tendering of moist cellulose have been estimated. The effect of the distribution of dye in the fiber has also been studied.

Photochemistry in Relation to Garment Dyeing and Dry Cleaning

A. Breare, Journal of the Society of Dyers and Colourists, page 693, Vol. 65, No. 12, December, 1949.

An attempt has been made to determine the effect of dyes on the photochemical oxidation of wool.

Generally, dyes offer protection to wool, but differ greatly in the degree of protection. Certain groups offer little protection, and in some cases cause acceleration of damage. The triphenylmethane group appears to offer least protection. No clearly defined effect of any chemical group of dyes or of any hue can be detected.

The influence of a particular dye on the rate of disintegration of wool under the action of light has an important bearing on the redyeing of worn garments and also on the launderability of such garments.

The Action of Light on Calcium Alginate Rayon

N. H. Chamberlain, F. Lucas, and J. B. Speakman, Journal of the Society of Dyers and Colourists, page 682, Vol. 65, No. 12, December, 1949.

The absorption spectrum of calcium alginate shows no bands, but a rapid rise in absorption with decreasing wavelength between 2400 and 2260 Å. In consequence, the full radiation of a quartz mercury-vapor lamp has been used in studying the action of light on calcium alginate rayon. When single filaments were irradiated in air at different relative humidities, the tenacity, measured at 65% R.H. and 22.2°C., was found to decrease only slightly with rise of relative humidity from 5 to 95%, the tenacity retained after exposure being 75.7 and 68.4%, respectively, of the original tenacity. In agreement with this observation, severe degradation was found to be possible in air, nitrogen, and oxygen after intensive drying for periods up to 201 days. It must be concluded, therefore, that neither oxygen nor water vapor is essential to degradation, though the rate at which it occurs is increased slightly by the presence of water.

When calcium alginate rayon was exposed to the light of the mercury-vapor lamp in air at 65% R.H. and 22.2°C., a good linear relationship between the reciprocal of the tenacity and the time of exposure was observed. The fall in tenacity is matched by decreasing viscosity of 0.5% solutions of sodium alginate derived from the exposed yarns, as would be expected if degradation is due to fission of the chain molecules. That fission does occur is confirmed by the rise in reducing power of the alginate, measured by oxidation with iodine, and there is a good linear relationship between the reciprocal of the reducing power and the specific viscosity of the solution of sodium alginate.

When calcium alginate yarn was irradiated in a stream of dry nitrogen for 10 hr., small amounts of water and carbon dioxide were evolved, viz. 0.047 and

0.050% respectively. As severe degradation was obtained under these conditions, the reactions responsible for the liberation of water and carbon dioxide can hardly represent the main course of degradation. Both aldehydes and ketones are formed during the process. When irradiation is carried out in dry nitrogen, equimolecular proportions of aldehydes and ketones are formed, but part of the aldehyde is oxidized when the yarn is exposed in dry oxygen or air at 65% R.H. Although the formation of equimolecular proportions of aldehyde and ketone during exposure in dry nitrogen provides an important clue as to the mode of degradation of calcium alginate, there are so many reaction schemes which are capable of accounting for this result that further evidence must be obtained before the manner in which main chain breakdown takes place can be defined.

Although calcium alginate undergoes such rapid and severe degradation during exposure to light, examination of other alginates suggests that the preparation of light-resistant alginates may not be impossible. Chromium alginate, for example, is much more resistant to degradation than calcium alginate, and the study of other alkali-resistant alginates is now being undertaken.

The Photooxidation of a Chlorophyll Preparation

William Lonie and Mowbray Ritchie, Journal of the Society of Dyers and Colourists, page 714, Vol. 65, No. 12, December, 1949.

Examination has been made of the photooxidation in white light of a chlorophyll preparation on various solids by the direct measurement of oxygen pressure decrease.

Rates were very low on glass, zinc oxide, aluminum oxide, thallous phosphate, and ferric phosphate, but were some ten times more rapid on thallous bromide and thallous iodide. No change in rate with thallous bromide preparations was observed in the presence of water vapor and carbon dioxide. The quantum efficiency on glass was of the order of 10^{-3} for blue light.

The oxygen : chlorophyll and the oxygen : carotene molecular ratios of the final photoproduct were almost exact unity. The final stable product is regarded as a hydroperoxide: partial reversibility of the oxidation was observed by simple pressure reduction.

In general, the course of the oxidation resembles that of some other organic molecule oxidations, being characterized by an induction period, by a constant-rate portion, and by a subsequent rate of oxidation slowly decreasing to zero.

The Mechanism of Photosensitized Reactions in Solution

Joseph Weiss, Journal of the Society of Dyers and Colourists, page 719, Vol. 65, No. 12, December, 1949.

Photosensitized reactions in solution generally proceed by mechanisms involving free radicals and radical ions. The initial step in all these processes is the interaction between an electronically excited form of the light-absorbing molecule and a suitable acceptor molecule which must be present in the system. A number of different examples have been discussed, particularly those where (a) the initial processes are identical with the elementary process of the quenching of the fluorescence of the light-absorbing molecule and where (b) the light-absorbing molecule undergoes transition to a triplet state (G.N. Lewis) which is capable of initiating the photosensitized reaction.

The Action of Ultraviolet Radiation on Proteins

R. Roberts, Journal of the Society of Dyers and Colourists, page 699, Vol. 65, No. 12, December, 1949.

The action of ultraviolet radiation on serum-albumin has been studied. In nitrogen polymerization occurs, but in oxygen there is a degradation of the protein molecule. The polymerization takes place by a free-radical mechanism. The degradation in oxygen is due to photooxidation by hydroxyl radicals.

Photosensitization of Polymerization Reactions

R. B. Whyte and H. W. Melville, Journal of the Society of Dyers and Colourists, page 703, Vol. 65, No. 12, December, 1949.

Some experiments in the photosensitization of polymerization of vinyl acetate and of methacrylic acid in aqueous solutions are described, the primary object being to investigate photochemical radical production in organic liquids and in aqueous solutions.

The Photochemical Formation of Atoms and Radicals in Aqueous Solution

M. G. Evans and N. Uri, Journal of the Society of Dyers and Colourists, page 709, Vol. 65, No. 12, December, 1949.

Atoms or free radicals (OH, Cl, F, N_3, etc.) are formed by irradiation of aqueous solutions of ion pair complexes, e.g. $Fe^{3+}OH^-$, $Fe^{3+}Cl^-$. The radicals produced by electron transfer excitation can be detected by their ability to initiate the polymerization of vinyl compounds.

Artificial Light Fastness Tests on Colored Textiles

W. L. Lead, Journal of the Society of Dyers and Colourists, page 723, Vol. 65, No. 12, December, 1949.

A résume is given of the various factors which influence the rate of fading of colored textiles by natural and artificial light, reference being made to both published and unpublished results.

The importance of humidity is stressed.

Two dyes of equal fastness under one set of conditions are not necessarily of equal fastness under other conditions. Consequently, it is possible for a dye to be rated differently on the British Standard (S.D.C.) system according to the conditions of testing.

It is impossible to express in a single number all the information about how a dye fades.

Agreement on a suitable physical method of measuring the degree of fading would help to remove some of the guesswork from present methods of colorfastness testing.

The Fastness to Light of Dyed Textiles

S. Burgess, Journal of the Society of Dyers and Colourists, page 732, Vol. 65, No. 12, December, 1949.

The significance is discussed of the light fastness of dyed textiles in trades intermediate between those in which it must be very high and those in which it is of little importance. The method of use of the S.D.C. standards is considered, and an account given of a series of exposures indicating various difficulties of assessment. The importance of exposing dyeings of binary and tertiary mixtures in addition to those of single dyes is stressed. It is shown that the same dye may have widely varying fastness on different fibers. The dyer's practical problem as to whether he is permitted to shade fast but difficult-to-apply dyes with easy-levelling but less fast dyes is discussed with some examples connected with the dyeing of matt staple fiber for the carpet trade. In this connection a comparison is made with the dyes used on wool for the same trade. The use of fading lamps is discussed, and some practical results are given of a comparison made between exposures of the same dyeings *(a)* in a Droylsdan Fadeometer and *(b)* to sunlight.

Testing Color Fastness in Sunlight and Artificial Light

Gosta Nordhammar and Nils Gralen, Journal of the Society of Dyers and Colourists, page 741, Vol. 65, No. 12, December, 1949.

Spectrophotometric measurements of eight dyes on cotton or wool faded in sun-

light and in the Fadeometer show the course of fading of the dyeings to be similar in the two cases.

Observations on the Anomalous Light Fastness of Some Dyed Textiles

Philip Walter Smith, Journal of the Society of Dyers and Colourists, page 743, Vol. 65, No. 12, December, 1949.

The anomalous behavior of certain direct and vat dyes on exposure to light under varying conditions is discussed, and the effect of crease-resisting resins of the urea-formaldehyde type on dyeings made with direct cotton, vat, and azoic dyes is reviewed.

The Action of Light on Jute

H. J. Callow and J. B. Speakman, Journal of the Society of Dyers and Colourists, page 758, Vol. 65, No. 12, December, 1949.

When jute is exposed to light and air, all the main components undergo degradation. An aqueous extract of the exposed material contains reducing substances, which may be aldehydes of low molecular weight derived from the cellulose by main chain fission, because the copper number of jute is increased by exposure. In addition, the aqueous extract is more acid than that from unexposed jute. Part of the acid seems to come from degraded polyuronides, and the remainder from the lignin, which loses methoxyl groups during irradiation. Their loss may lead to the formation of *o*-diphenols and, ultimately, *o*-quinones. These seem to be the main cause of the discoloration which jute suffers duing exposue to light and air.

In the light of these observations, it seemed probable that discoloration would be prevented by methylation or acetylation. Jute is bleached by treatment with diazomethane, but subsequent discoloration during exposure, though minimized, is not entirely prevented. Better results were obtained by first bleaching jute with sodium hypochlorite and hydrogen peroxide, and then acetylating with a mixture of acetic anhydride, xylene, and sulfanilic acid at the boil. Acetylation for 3 hrs. gives a product which bleaches during irradiation, but some discoloration takes place during acetylation. When, however, the jute is treated for only 1 hr., the primary discoloration is minimized, and the degree of acetylation is such that neither discoloration nor bleaching takes place during exposure.

The bleaching of highly acetylated jute during irradiation is favored by the presence of oxygen and water. Acetyl groups are lost during exposure, and it seems probable that bleaching is caused by the formation of acetyl peroxide, which was shown to be capable of bleaching acetylated jute.

The Photochemical Degradation of Starch and Allied Carbohydrates

W. J. Whelan and Stanley Peat, Journal of the Society of Dyers and Colourists, page 748, Vol. 65, No. 12, December, 1949.

The breakdown of carbohydrates by ultraviolet radiation has been studied, using as the principal substrate the amylose component of potato starch. Two distinct types of photodegradation are recognized—

One type, occurring in the presence of oxygen, is a photooxidation (for which zinc oxide is a powerful sensitizer) followed by a light-sensitized hydrolysis and further oxidation, which results in the complete conversion of the amylose to carbon dioxide via the intermediate products formaldehyde and formic acid, all three of which have been identified. The photooxidation is believed to be similar to oxidation effected by the periodate ion, which oxidizes the α-glycol group situated at C 2 and C 3 of the glucopyranose ring, with the production of two aldehyde groups. Hydrolysis of the oxidized amylose liberates fresh α-glycol groups and further oxidation then ensues. The results of the aerobic photodecompositions of potato starch, potato amylopectin, maltose, glucose, and α-methyl glucoside agree with, and provide additional support for this hypothesis.

The second form of photodegradation takes place in the absence of oxygen, and has been studied in an atmosphere of highly purified nitrogen. The final products, as yet unidentified, do not include those of the aerobic degradation, and are characterized by a marked resistance to subsequent photooxidation.

The Mechanism of the Photochemical Degradation of Textile Materials

G. S. Egerton, Journal of the Society of Dyers and Colourists, page 764, Vol. 65, No. 12, December, 1949.

The photochemical degradation of textile materials is discussed under two main heads—

I. Photolytic Degradation with Short-wave Ultraviolet Radiation—The degradation of cotton and other textile fibers with radiation of wavelength 2537 Å is not dependent upon the presence of oxygen in the surrounding atmosphere. In some cases (e.g., cotton and viscose rayon) the loss in strength in carbon dioxide or nitrogen is nearly as great as in oxygen; in other cases (e.g., nylon) there is greater degradation in oxygen, but still substantial degradation in carbon dioxide.

The effect of vat dyes on the rate of degradation of cotton is discussed. All the vat dyes examined were found to desensitize the photolytic degradation of cellulose. Dyes such as Caledon Yellow 5G and Cibanone Yellow R decreased the degradation of cotton in atmospheric air, dry oxygen, and inert gases.

II. Photochemical Oxidation with Near Ultraviolet and Visible Light—The photochemical degradation of cotton and other textile fibers by light transmitted through glass is increased by various dyes and pigments. The sensitizing dyes may belong to the following classes—vat, acetate, direct cotton, basic, acid, and sulfur; the pigments include zinc oxide, zinc sulfide, and titanium dioxide. The degradation of the various textile fibers is dependent upon the presence of oxygen in the surrounding atmosphere and is negligible in its absence. The mechanism of the degradation is discussed, and the evidence for the suggestion that the degradation is due to oxidation of the fiber by activated oxygen and hydrogen peroxide is examined. Evidence is described which favors the belief that activated oxygen is a metastable form of molecular oxygen.

Irreversible and Reversible Photobleaching of Dyes

Robert Livingston, Journal of the Society of Dyers and Colourists, page 781, Vol. 65, No. 12, December, 1949.

Fifteen reaction steps have been demonstrated to occur in solutions (or other simple systems) of dyes and pigments. Although no one compound has been proved to undergo all of them, they, and probably additional reaction steps, must be considered as constituting the primary processes for photochemical reactions of dyes. Some attempt has been made to suggest how these reaction steps may be related to irreversible and reversible photobleaching of dyes under conditions of technical importance.

Photooxidation and its Relation to Fading and Photodegradation Special Case of the Photodecolorization of a Nonnitrogenous Vat Dye—Ixone

Charles Dufraisse and Maurice Loury, Journal of the Society of Dyers and Colourists, page 786, Vol. 65, No. 12, December, 1949.

Ixone, which is a nonnitrogenous vat dye, the simplest known for so deep a color as green, contains in its molecule an anthracene ring system capable under the influence of solar radiation of combining with oxygen to give a colorless photooxide. The sensitivity of this dye to sunlight may thus be explained, and the hypothesis may be extended to other dyes containing the same structure.

TRADE NOTES • NEW PRODUCTS

Head Table at PTI Alumni Dinner—(L. to R.) Bertrand Hayward, Theodore Hayward, Samuel K. McConnell, Jr., Howard Galloway, Harry C. Pope, Col. Millard D. Brown, Richard S. Cox, R. A. Lukens and E. K. Pierson.

• Annual PTI Reunion and Dinner

The annual reunion and dinner of the Philadelphia Textile Institute alumni association, held at the Warwick Hotel, Philadelphia, Pa., on Jan. 27 featured Samuel K. McConnell, Jr., Congressman of the 16th district of Pennsylvania as the main speaker of the evening.

Harry C. Pope of New Bedford, Mass. followed Rep. McConnell's speech with a humorous talk.

Others at the main table included Bertrand Hayward, Director of PTI, Theodore Hayward, Chairman of the PTI Board of Trustees and Chairman of the Foundation Building Committee, Howard Galloway, President of the PTI alumni association and MC for the evening, Col. Millard D. Brown, President of the PTI Foundation, Richard S. Cox, PTI Dean, R. A. Lukens, President of PTI, and E. K. Pierson, Managing Director of the Philadelphia Textile Manufacturers Ass'n.

Edward G. Haack was Chairman of the Banquet Committee.

The association announced that its annual outing will be held on June 2. The location will be fixed later.

Rep. McConnell, in his address, called for a reversal of the current trends towards increased centralized government through a five point program of individual action:

(1) Acquire a broad background and consider the events of the past which preceded the present situation.

(2) Learn the basic facts concerning our American type of government and compare it with other systems in the world.

(3) Maintain an active interest in local government.

(4) Study the important problems now being considered in this country. Analyze the proposed solutions and see if they confirm to the concept of our American Republic.

(5) Become an active participant in practical politics.

• Avisco's Research Described on "Voice" Broadcast

In a recent "Voice of America" broadcast, Rene Bouvet, head of the textile development branch of the American Viscose Corporation textile research department told the French-speaking world about textile research activtiies at Marcus Hook and how the company's applied research extends to most branches of the textile industry. He was interviewed by Raymond Hauger, an American of French descent on the staff of Voice of America, for the French program, "Here is New York."

Mr. Bouvet told how the introduction of crimped staple by Avisco "is making it possible to produce blends with lower grade wools and at the same time to increase the efficiency of manufacturing processes."

"As a sequence to this development," Mr. Bouvet said, "our research plant is running tests for the Government extending from staple blends to fabrics to determine the effects of lower grade wool blends on spinning, on cloth handle, and on wearability."

In addition to reviewing the work of the textile research department, Mr. Bouvet also told how Avisco's fabric development department in New York draws plans for new fabrics "to explore the merits of new or seldom-used fibers, unusual blends, complicated weaves or other characteristics," then sends those plans to textile research to be built into the actual fabrics.

Mr. Bouvet was invited to make the broadcast by the State Department, of which the "Voice of America" is a part, at the suggestion of the Textile Research Institute.

• New Michel Data Sheets

Latest additions to the "Michelene Guide to Surface-Active Agents" include data sheets on a concentrated surface-active agent and a low cost wetter. These file-sized bulletins are available to chief chemists, production managers, and purchasing agents representing potential users in the chemical industries from M. Michel and Company, Inc., 90 Broad St., New York 4, N. Y.

• PTMA Winter Dinner

The Dinner Committee of the Philadelphia Textile Manufacturers Ass'n., 814 Public Ledger Bldg., has announced the Association's regular Winter Dinner will be held Thursday, March 9th at the Germantown Cricket Club, Manheim and Morris Sts. (Germantown).

Thomas M. Hyndman is Chairman of the committee which includes Charles Hofmann, James Wilson & Sons, John McChesney, Leatex Chemical Co., Edwin G. Michie, A. Y. Michie & Sons Co., and Joseph Z. Muir, Robert Lewis Company.

James J. O'Donnell, Jr.

• New American Aniline Credit Manager

James J. O'Donnell, Jr., has been appointed Credit Manager of American Aniline Products, Inc., according to an announcement released at the executive offices, 50 Union Square, New York City.

In his new duties he will supervise the company's credit relations with its customers throughout the United States.

Mr. O'Donnell has been with American Aniline Products approximately 15 years and, for the time being, will also continue in his previous capacity as Traffic Manager.

• Anglo-American Textile Group to Visit Japan

The visit of an Anglo-American textile group to Japan has been tentatively scheduled for sometime in April. This decision was announced following a meeting of the officials of the American Cotton Manufacturers Institute in Greenville, S. C.

The tentative date was selected following consultations with Robert T. Stevens, chairman of the Anglo-American Textile Conference held recently in New York, and with the various government agencies concerned, among them SCAP. Exact determination of the date for the journey of the group which will consist of four representatives each of the American and British cotton industries will be conditioned on the convenience of the British representatives and will be announced following consultation with officials of the British Cotton Board.

The personnel of the American group has not yet been designated but it is expected that the appointments will be announced within the next few weeks, according to Ellison S. McKissick, president, American Cotton Manufacturers Institute, who presided at the meeting. Selection of the April date will make it possible for all American members of the group to attend the annual meeting of the Institute at Palm Beach on March 30-April 1.

The visit to Japan was strongly recommended by the Anglo-American Textile Conference.

• Merahn Appointed ASA Committee Chairman

Appointment of Harold R. Merahn, Sales Promotion Manager and Vice President of Gertz Department Store, Jamaica, N. Y. as chairman of the Promotion and Education Committee on Rayon Finished Fabrics, has been announced by Vice Admiral G. F. Hussey, Jr., managing director of the American Standards Association. The appointment was made by Jay D. Runkle, Vice President and General Manager of Crowley Milner Company, Detroit. Mr. Runkle heads the ASA Sectional Committee on Rayon Fabrics which is developing standards for the end use of rayon fabrics under the sponsorship of the National Retail Dry Goods Association.

Mr. Merahn's committee, which is now being organized, will be in charge of coordination on a national scale of advertising, promotion, and education for a program of certification and labeling of rayon fabrics. The educational program of Mr. Merahn's committee will provide information for buyers in department stores, selling personnel of department stores, consumers, and industries producing rayon fabrics which meet the requirements of quality to be established through the ASA sectional committee.

Those who have already accepted membership on Mr. Merahn's committee are: James Rotto, Sales and Publicity Director, The Hecht Company, and Charles M. Edwards, Dean, New York University School of Retailing.

Recommended standards completed by its subcommittees were considered by the ASA sectional committee on rayon fabrics at a meeting held on February 15. Chairmen of these subcommittees are:

Special Joint Committee on Women's and Men's Wearing Apparel—Cameron A. Baker, Research Engineer, U. S. Testing Company, Hoboken, N. J.

Special Committee on Home Furnishings—George H. Johnson, Vice President, American Institute of Laundering.

Women's Wear—Henry G. Leef, Divisional Merchandise Manager, Woodward and Lothrop, Washington, D. C.

Men's Wear—Robert B. Coons, Merchandise Manager, Franklin Simon, N. Y. assisted by Cameron A. Baker.

Home Furnishings—Gordon K. Creighton, Assistant General Manager and Assistant Treasurer, National Retail Dry Goods Assn. (Chairman pro-tem) assisted by George H. Johnson.

Technical Committee on Certification, Labeling, and Terminology—Charles W. Dorn, Director of Research and Testing Laboratories, J. C. Penny Company, New York.

Administrative—Gordon K. Creighton, Assistant General Manager, and Assistant Treasurer, NRDGA.

• Garment Dyers Organize Trade Association

The Garment Dyers Guild of America was formed at a December meeting at Cleveland's Statler Hotel, represented by an attendance of 11 dye houses plus an additional 4 who were present by proxy.

The 15 representatives, under the Chairmanship of Ben Rosenfield, Chicago attorney and executive director of the Chicago Dry Cleaners Association, form the new group which has been chartered to serve the needs of a national organization in this industry.

The primary objective of the Guild will reportedly be to promote, foster, advance and protect the interests and welfare of the dyeing industry, and to assist the industry in serving the drycleaner. Membership is open to owners and operators of garment dyeing plants in the United States.

The Garment Dyers Guild of America has reserved booth number 416 at the March Convention of the NICD to be held at Chicago's Navy Pier, at which time they will invite additional membership from qualified plants, as well as attempt to assist drycleaners in questions revolving around dyeing, it is announced.

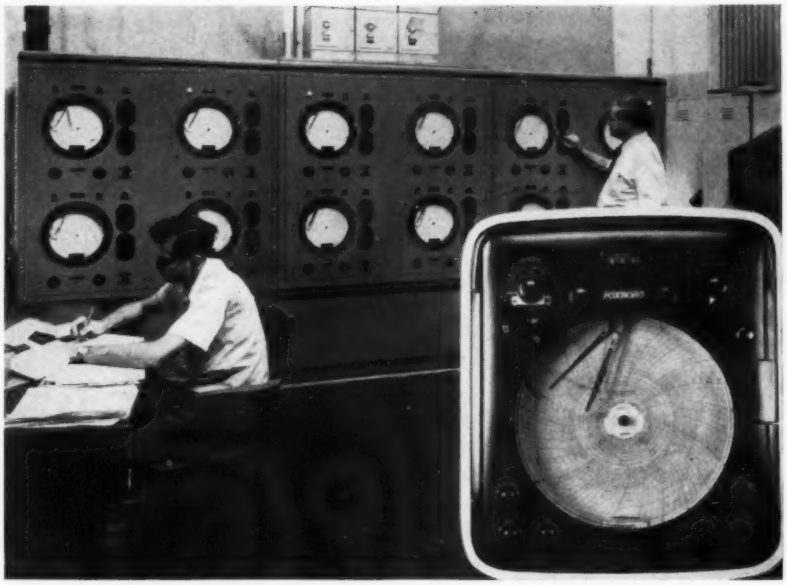
John Egli of General Dyeing Co., Inc., Indianapolis, is Secretary-Treasurer of the new organization and inquiries should be addressed to him.

• Mixed Bed Demineralizing Equipment

Development of Mixed Bed (cation-anion) Demineralizing equipment is announced by the Illinois Water Treatment Co., Rockford, Ill. According to company officials, the Illco-Way mixed bed unit produces a chemically pure water containing less than one part per million total solids, having a pH of 7 and resistances of over 10 million ohms per cubic centimeter. Other advantages claimed for the Illco-Way mixed bed unit are that it requires less regeneration time, less installation space and a lower initial investment than standard two or four bed demineralizers. Additional information is available on request to the Illinois Water Treatment Co.

• Paull and Porter Appointed To Executive Committee

Harold Church Paull, Providence, R. I., banker, and Seton Porter, Chairman of the Board of National Distillers, were appointed to membership on the Executive Committee of the Board of Directors of General Aniline & Film Corporation at the Board's January meeting. Mr. Paull was elected to General Aniline's Board last November and Mr. Porter has been a member for the past two years.



An installation of 11 Foxboro CycleLog Controllers, Dorlexa Dyeing and Finishing Co., Woonsocket, R. I. Inset shows the new Model 40 CycleLog.

• Model 40 CycleLog Controller

Features of the CycleLog Controller for automatic control of textile dyeing machines, and of the Model 40 Controller, are now combined in the new Model 40 CycleLog according to The Foxboro Company, Foxboro, Mass.

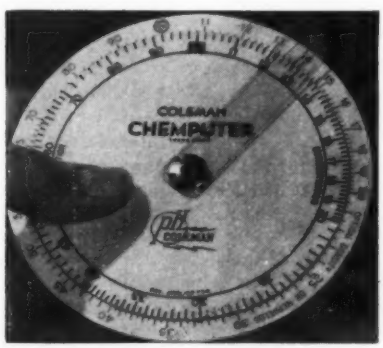
It is said to be essentially the same control instrument as the previous model, but incorporates improvements in design which reportedly offer new advantages and greater convenience, beside making possible a more compact assembly. This is of importance when instruments are to be panel mounted, as three can now be installed in the panel width which two formerly required.

The CycleLog Controller is said to be the first completely automatic dye cycle controller having no cam-mechanism nor any auxiliary instrument. Though primarily designed for dyeing control, it has found application in other industrial processes of the batch type.

A feature of its performance is the control of rate of temperature rise, in a dye bath for example, beside maintaining the correct dyeing temperature and starting its holding period timer when that temperautre is reached. All settings for the dyeing cycle are made by means of four knobs on the front of the instrument case, including the rate of temperature rise in degrees per minute, and the holding period, from five minutes to three hours. When the operator pushes the "Start" button the CycleLog takes over, and operation becomes fully automatic, it is stated. At the end of the cycle the heat supply shuts off and a signal lamp calls the operator. If the same cycle is to be repeated the operator pushes the "Start" button again when the dye machine has been loaded.

Two additional timers (adjustable inside the case) have been added in the Model 40 CycleLog. The initial timer is used to allow the dye bath to come to a uniform level temperature before the addition of the dyestuff and the start of the controlled rate of temperature rise. The duplicate timer, for overtime periods, has a separate push-button. Thus, at the end of the usual dyeing cycle, if more color has to be added, this overtime button is pushed to start the controller and the timer. At the close of this pre-set overtime period, the steam valve closes and the "end of cycle" light comes on again.

The operational features of the Model 40 CycleLog Controller are described in a new illustrated bulletin No. 438, copies of which will be sent on request. Address The Foxboro Company, Foxboro, Mass.



Coleman Chemputer

• Calculating Device for Laboratory Computations

Coleman Instruments, Inc., 318 Madison Street, Maywood, Illinois, have announced the Coleman Chemputer, a new calculating device. Based on equipment originally developed for Aerial Navigation, it consists of a pair of sliding scales plus a hairline finder.

A single setting of the scales will solve any problem of simple proportion and will calibrate any instrument or analytical method yielding linear data, the company states. Results are read directly on the scale without preparing tables or curves.

The Chemputer is said to establish any linear calibration instantly, retain such calibrations for future use, signal potential errors in standard data and be simply reset to provide complete new calibrations for changes in standard data or methods.

Write for Bulletin B-220.

• ΔΚΦ Convention

Delta Kappa Phi Fraternity, the oldest textile fraternity in America, is to hold its annual convention on April 28-29-30, 1950 at Lowell, Massachusetts.

Chapters of this fraternity are located at the Lowell, New Bedford and Philadelphia Textile Institutes, North Carolina State College and Georgia Tech.

Meeting Dates, S.O.C.M.A.

Following is the schedule of meeting dates for the Synthetic Organic Chemical Manufacturers Association during the balance of 1950:

March 14.
April 12.
May 10.
June 19-21 (Outing).
September 13
October 11
November 8
December 13 (Annual Meeting and Dinner).

Except for the outing, all of the meetings will be held at the Hotel Commodore, New York.

Plans call for a joint outing with the Manufacturing Chemists' Association on the June dates at the Hotel Monmouth, Spring Lake, New Jersey. The tentative schedule includes business meetings of both associations on the first day, leaving the second free for a golf tournament and other sports, with a banquet in the evening. The S.O.C.M.A. committee on arrangements consists of B. M. Van Cleve of Sherwin-Williams Co. as chairman, V. E. Williams of Monsanto Chemical Co., and S. Stewart Graff, S.O.C.M.A. Secretary.

• Greaves Awarded Salesmen's Scholarship

The first annual scholarship given by the Textile Salesmen's Association of New York was awarded to Sydney Greaves of Clifton, New Jersey, a Sophomore at the Philadelphia Textile Institute, according to an announcement by Director Bertrand W. Hayward.

This new scholarship of $600.00 annually for three years, goes to a student in the Sophomore class of Philadelphia Textile Institute. It is based on scholastic achievement, qualities of character, and financial need.

Mr. Greaves, a veteran of World War II, is married and has three children. He has had textile experience with the Waldrich Company of Delawanna, New Jersey and Forstmann Woolens of Passaic, New Jersey, and is a member of A.A. T.C.C.

• Pacific Mill "Memoirs of a Corporation"

The story of the development of the American textile industry since 1850 is unfolded in the "Memoirs of a Corporation," which Pacific Mills, one of the oldest and largest textile manufacturers in the world, is publishing in eleven monthly installments to mark its 100th anniversary year.

The anniversary book tells the story of "Weaving a Century"—the anniversary year slogan—in a new and original way. This is a story of people—starting with Abbott Lawrence, the pious founder who staked his all on a pioneering venture and lived to see Pacific Mills through its critical early years, his colleagues, the mill hands, the department bosses, wool buyers and salesmen, "the immigrants and their children, the Irish, Italians, Germans, Britons, French, Russians, Swedes and Finns"—who helped to "weave the century" and build a great American institution.

It is, for one thing, an account of how pioneering Americans originated the "integrated mill" system to combat British competition in textiles. That system called for spinning and weaving, the printing of cloth, and eventually the designing of fabrics under one roof and a single control.

Mary and Mack "Carmack," representing the fourth generation of Irish families who came across the Atlantic to take jobs in the mills, are characters in the story. They win a trip through all of Pacific Mills, which now spread over the North and South, and see modern fabrics in the making—woolens and worsteds, sheets and pillow cases, towels, silver cloth (for wrapping silver), rayons, plain and printed cottons.

Through the eyes of Mary and Mack, the reader learns about the textile properties of Pacific Mills, about the philosophy of its founders and their successors down to the present management generation.

From the start, Pacific Mills made both cotton and wool textiles. It had its beginnings in Lawrence, Mass., where the company built a stone dam across the Merrimac River to provide power for its mills.

• U. S. Testing Adds Facilities

The United States Testing Company, Inc., Hokoben, N. J., has recently added to its list of apparatus used in the testing of paper, a Gurley-Hill S-P-S Tester. With this apparatus it is said to be possible to make porosity, smoothness and softness measurements on paper materials.

The Paper Laboratory of the United States Testing Company, Inc., is prepared to undertake the examination of paper and pulp, in accordance with the Standard methods of the Technical Association of the Pulp and Paper Industry (TAPPI). These include the measurement of surface appearance characteristics, such as brightness, luster and color.

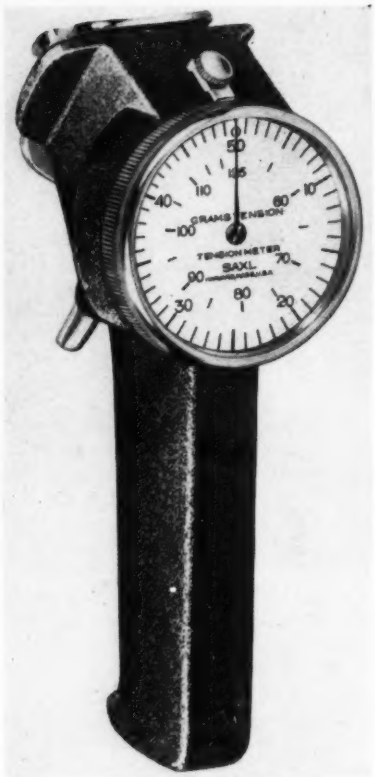
• N. E. Spectrochemical Lab Literature

New England Spectrochemical Laboratories, County Road, Ipswich, Mass. has issued literature relative to its activities in quantitative analyses of minor constituents and spectrographic searchings. Service costs and coverage ranges are included. Literature available on request.

• Folder on Applications of Laminated Plastics

A folder describing the applications of laminated plastics in the textile industry has been prepared by the Synthane Corporation of Oaks, Pa., manufacturer of these plastics and fabricator of textile machine components and mill equipment. It shows how the strength, lightness, nonsnagging surfaces, chemical resistance and moisture resistance of the laminated plastics have led to their widespread use by the industry.

Products described include headless package tubes, precision bobbins and pirns, hosiery turning and examining forms, furnisher and other rolls, redraw caps, drier poles, dye sticks and many others. For the nylon industry, too, the folder discusses sizing bobbins and caps, and Synthane piping for sizing machines. Copies are free on request to the manufacturer.



Saxl Tensiometer

• Improved Tension Meter

Instant trigger action and correct calibration under performance conditions are said to mark a new and improved Tension Meter recently brought out by the Saxl Instrument Company of Harvard, Massachusetts. The new model is reported to be equipped with ball bearings throughout with precision pulleys recessed in the trigger mechanism to automatically guide the yarn into position so that the meter can be inserted blind and to prevent yarn catching behind the rollers.

A transparent flywheel through which the readings are taken is said to make steady readings possible even on quickly traversing machinery. Sustained accuracy is reportedly obtained because the permanently calibrated spring is always at rest when not in use. The meter, dynamically calibrated under actual performance conditions, is far more practical than static testing, the company states.

Double the sensitivity, extended capacity, quick trigger insertion (even in limited spaces) and freedom from oscillations are said to make this meter ideally suitable for quick tension measurements on all yarns including nylon and rayon and on machines such as warpers, winders, slashers and for winding elastic threads, checking shuttle tension, etc.

• Poor Elected to NAFTF Presidency

The National Association of Finishers of Textile Fabrics elected Arthur G. Poor president at their 36th annual meeting last month at the Hotel Statler, New York. Mr. Poor succeeds G. D. Harrison, of the Lewiston Division of the Pepperell Manufacturing Co., Lewiston, Me., who was elected chairman of the executive committee.

Sydney M. Cone, Jr. of Cone Finishing Co., Greensboro, N. C. and Walter R. Howell, of Bradford Dyeing Association, Westerly, R. I. were elected to vice-presidencies. Mr. Cone was elected for his third term in this capacity.

Miss Alice C. Moore was reelected association secretary and treasurer.

Proceedings at the meeting included a discussion by guest speaker Dr. Charles F. Phillips, president of Bates College, on "Twenty Years of Revolution in Washington"; presentation of an engraved silver tray to William Berry, Riegal Textile Corp., retiring chiarman of the executive committee; and annual reports by President Harrison and Secretary-Treasurer Moore.

Miss Moore's report contained numerous items of interest concerning membership, statistical service, color classification, testing and standards, flammability of textiles, water-repellent fabrics and color fastness.

Citing the increase in the use of the association color classification service, Miss Moore stated that during 1949 there were made 33,793 color classifications. This represents an increase over 1948 of 20 percent and an increase of 752 per cent over 1943.

"During 1949, vat colors represented 74 per cent of the classifications made. Of that number, 51 per cent were Class 1 and Class 2 shades, the balance being 3, 4, 5 and Special. The largest number of classifications in any one class were in Class 1."

She went on the disclose figures covering the trend of printing machine usage. These showed a slight increase in number since 1945.

Other parts of the report defined the association's cooperation with other organizations such as the Federal Trade Commission, the National Bureau of Standards, and the American Standards Association in such fields as color fastness, water-repellent fabrics, testing and standards.

In regard to flammability, Miss Moore's report mentioned that "research work continues in the field of flammability of textiles.

"Various interests affected, from the primary market through the retail field, have made up a fund to establish a fellowship under the supervision of the American Association of Textile Chemists and Colorists to continue studies and research at Lowell Textile Institute. Your association (the NAFTF) has contributed its equitable share to that fund from the special fund carried by the association for such purposes. It is understood the research work being carried on with this fund will continue for some months to come."

• Chromium Chemicals Handbook Issued by Diamond

A 32-page handbook on chromium chemicals, depicting their general use and diversified applications in more than 17 different industries, has been prepared by Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio, for chemists, metallurgists, engineers, production managers, purchasing directors and other interested executives.

Spiral-bound, 8½" x 11" size for filing, the brochure presents data on bichromate of soda, its manufacture, and its principal uses, including leather tanning, production of dry colors, synthetic dyes and intermediates, and processing of certain synthetic organic chemicals.

Among other applications cited are its utilization as a mordant for wool and to improve color fastness; and as a means of inhibiting corrosion in water-cooled or water-circulating equipment.

Similar information is also given for Diamond sodium chromate and bichromate of potash. In addition, the booklet discusses six methods of analyzing sodium bichromate. Supplementing this information are charts and tables covering equivalent weights, conversion formulas, tank capacities and graphical data.

Copies are available to readers upon letterhead request.

• January Technical Meeting CATCC

The January meeting of the Canadian Association of Textile Colourists and Chemists was a technical meeting devoted to various methods of bleaching. Under the heading of "An Evening of White" several members described the bleaching of different fibers:—

"The Bleaching of Cotton"—C. F. Fitton.

"The Bleaching of Wool and Silk"—E. G. Drake.

"The Bleaching of Viscose"—C. E. Coke.

"Optical Bleachers"—C. R. Teichgraber.

The meeting, which took place in the Brittany Room of the Mount Royal Hotel, Montreal, on Saturday, January 21st, started with a Buffet Dinner at 7:00 p.m., and was followed by the technical talks in the same room.

C. B. Robinson

Robinson, Wyandotte V.P., Retires

Retirement of C. B. Robinson, vice president of Wyandotte Chemicals Corporation in charge of the J. B. Ford Division, has been announced by Robert B. Semple, president. He has stated, however, that Mr. Robinson will continue to serve Wyandotte as a sales consultant.

He joined the J. B. Ford Company in 1917, working his way up until he became President of the J. B. Ford Sales Company in 1929. In 1943, when the company was made a division of Wyandotte, he became vice president of the parent organization.

Mr. Robinson has been active in affairs of various national trade groups, including the American Institute of Laundering. He also is a member of the Detroit Board of Commerce.

• New Colloids Unit in Carolina

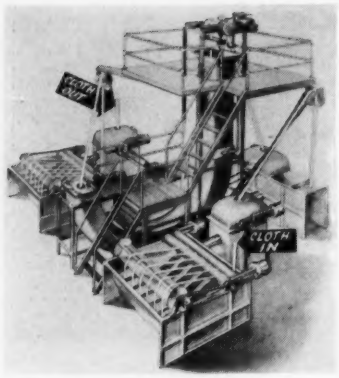
Colloids, Inc. has opened a new manufacturing unit at High Point, N. C. with William F. Mann as its managing director and treasurer. It is reported that the same products (e.g., textile sizing agents) are now being manufactured there as in the parent company in Newark, N. J.

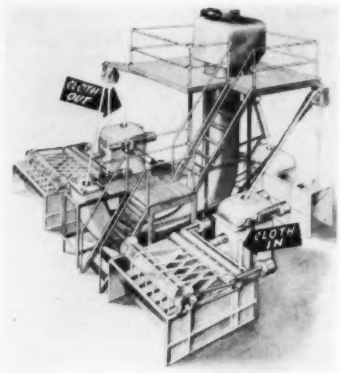
The new unit is said to be equipped to produce a complete line of products for synthetic warp sizing, crepe throwing, yarn preparation and conditioning, and dyeing and finishing of all types of fiber and fabric. All mill and plant processing will be spot-checked by the company's own local technical service staff.

• ACCCE Meeting Dates

The Association of Consulting Chemists and Chemical Engineers, Inc., will hold two meetings in 1950 at the Hotel Shelburne, New York, N. Y. Both will include banquets and guest speakers and begin at 5 P.M.

The first will be held April 25 and the second, the annual meeting, October 24.





"Bantam" Range with Features for Becco and Du Pont Processes

• "Bantam" Continuous Bleaching Range

Announcement has been made of a "Bantam" Continuous Bleaching Range by the Weisner-Rapp Co., Inc., Buffalo 10, N. Y. This miniature range is said to provide smaller mills with all the economies and advantages of continuous bleaching and to aid the larger ones in specialty bleaching.

The product reportedly incorporates all the design principles and features of the full size Weisner-Rapp Continuous Range. The "J" Box, Washers, Squeezers and Saturators are all independent components and can be set up by grouping around the central "J" Box or in a straight line set-up, it is stated. This flexibility is said to allow the range to be relocated to fit into future plant planning or layout. Nested together this Range reportedly occupies 16' x 20' floor space and 16½' height, most of which can be attributed to the "J" Box. 52 feet are required in a straight line installation, the company states, and it can be used in conjunction with a full-size range.

Capacity is reported up to 900 lbs. an hour with adjustable speeds of 25 to 125 yards per minute. As can be seen from the photographs, the range can be furnished with features for either the Dupont or Becco processes.

Complete information can be obtained by writing The Weisner-Rapp Co., Inc.

• New Technical Catalogues

Condenser Service & Engineering Co., Inc., Seaboard Trust Building, Hoboken, N. J. has issued new catalogues on the following: steam condensers, steam jet air ejectors, oil and water coolers, packaged power boilers, and centrifugal and piston pumps.

All are profusely illustrated and contain complete data and chart coverage as well as descriptive and tabular material.

• Hall Honored by Co-Workers

W. C. Hall, divisional superintendent of the rayon department at the Rock Hill Printing and Finishing Company, Rock Hill, S. C., was honored with a dinner given recently at Park Inn Grill on the Charlotte highway. The dinner party was given by co-workers at the Bleachery.

William M. Hull served as toastmaster. W. P. Clement and Charles Smith arranged for the party.

Mr. Hall has resigned his position at Rock Hill after 12 years with the company. He has moved to New York with his family to assume a related position to the one held at the Bleachery.

The more than 40 guests presented him with a leather traveling bag as a parting gift.

• Hooker to Increase Caustic Soda and Chlorine Output

E. R. Bartlett, President of the Hooker Electrochemical Company, Niagara Falls, N. Y., has announced that the company will increase production facilities for caustic soda and liquid chlorine at its Tacoma, Washington plant. The work, which will be in charge of the company's own engineering staff, is expected to be completed in October, 1950, and will consist primarily of rounding out facilities already at hand. Existing buildings will largely house the new equipment although several building additions will be made. Two circuits of old Type E electrolytic cells will be removed and replaced by the newest Type S-3 cells which have far greater capacity for producing caustic soda and chlorine. The Type S-3 cells are a recent development of Hooker Research and Engineering. In addition to the new cells, extensive additions of the most up to date equipment for handling and treating brine, purifying caustic and liquifying chlorine will be made. Triple effect pans will be used for caustic evaporation and a new boiler will supply additional steam requirements. Provision is to be made for additional rectifier capacity for converting alternating current to direct current required for the cells. Other facilities will include a new cell construction and renewal building, additional storage tanks, water supply, expanded dock facilities, increased chlorine handling and liquefaction equipment, etc.

In cooperation with the Detrex Corporation, Hooker is also now building a Hooker-Detrex plant for the manufacture of chlorinated solvents at Ashtabula, Ohio. This new plant is similar to, but larger than the Hooker-Detrex plant built three years ago at Tacoma.

• Corrosion Resistant Fans

Durco Corrosion Resisting Fans are made of parts cast in Duriron, Durichlor, or Durimet 20, three alloys of the Duriron Co., Inc., manufacturers of the product.

The fans are built in five sizes with capacities up to 7500 C.F.M. with most frequent applications for removing fumes from chemical laboratory hoods, kettles and autoclaves, kjeldahl units, plating tanks, drying and absorption towers, chlorine storage rooms, and pickling tanks.

Price List H-2, just issued, illustrates all Duriron Acid Proof equipment now available for handling corrosive wastes. A major revision of a listing of this high silicon iron drain line material for handling acids, it contains new items and items of improved construction.

The most notable design improvement is the use of cap style cleanouts and C clamps. It is said to reduce to a minimum the area of metal that can be subjected to corrosive attack from trapped solutions. The C clamp is designed so that excessive tightening will break the thumb screw first.

Information on the fans can be had by asking for bulletin 1103, available along with Price List H-2. Both are publications of the Duriron Co., Inc., Dayton 1, Ohio.

AUSPICES OF
NATIONAL TEXTILE MACHINERY MANUFACTURERS ASSOCIATION
AMERICAN
TEXTILE MACHINERY
EXHIBITION
ATLANTIC CITY
MAY 8-12, 1950

James J. Marshall

• Marshall Appointed Domestic Sales Manager for American Aniline

George L. Armour, president of American Aniline Products, Inc., has announced the appointment of James J. Marshall as Domestic Sales Manager, in complete charge of sales throughout the country. Mr. Marshall has been with the company for twenty years, having started in 1930 in the New York office.

In 1935, he was transferred to the Providence, R. I. office at the time of its opening. From 1937 to the end of 1941, he was selling in the Rhode Island territory. In 1941, Mr. Marshall commenced his war service in the Chemical Warfare Division of the United States Army and ended up with the rank of Major. He received a number of decorations, including the Silver Star. After he returned from his war service, he was appointed in 1946 as assistant to the Executive Vice President.

• Vinyl Coatings Range Developed

The Watson-Standard Company, 225 Galveston Avenue, Pittsburgh 12, Pa., announces the development of a wide range of new Vinyl Dispersion type coatings available in the form of Vinyl Organosols and Vinyl Plastisols, and having application in the coating and molding field.

Available at solids of 80 to 100%, they are said to utilize either no solvent or at most, inexpensive solvents, thereby making it possible for the converter to obtain savings without the benefit of a solvent recovery system.

Coatings from this type of compound are said to show excellent resistance to organic and mineral acids, alkali, soap, grease, butter, cheese, oil, cosmetics and other chemicals both wet and dry.

Complete information regarding these Vinyl Dispersions may be obtained from the manufacturer, The Watson-Standard Company.

• Crucible Steel Appointments Announced

Appointments of David Kirk Stuart as Manager of the Pittsburgh Branch of the Crucible Steel Company of America and Richard J. Rand as Assistant Branch Manager were announced by W. H. Wiewel, Vice President in Charge of Sales. The appointments became effective January 1.

David Kirk Stuart

Mr. Stuart will fill the position left open by the promotion of John S. Billingsley to Central Sales Manager on August 17, 1949. Associated with Crucible since 1933, he was first employed at the company's Park Works, and in 1935 was transferred to Pittsburgh Branch Sales. Mr. Stuart is a native of Youngstown, Ohio, and a graduate of Williams College, Class of '31.

Richard J. Rand

Mr. Rand joined Crucible in 1940, the same year he was graduated from Waynesburg College. In 1942 he was appointed Office Manager of the St. Louis Branch. During the War, Mr. Rand served in the U. S. Coast Guard as Engineering Officer. He returned to Crucible in March 1946 as Sales Service Engineer, which position he held until his appointment as Office Manager of the Pittsburgh Branch in 1948.

• Remensnyder Elected Heyden President

At its meeting of January 19, 1950, the Board of Directors of Heyden Chemical Corporation elected John Paul Remensnyder president, to succeed Bernard R. Armour, who died on December 1, 1949.

J. P. Remensnyder

Mr. Remensnyder has been associated with the company since 1920. He was elected a director and vice-president of the company in 1944, and has been in charge of the company's sales.

Among his numerous activities, Mr. Remensnyder is a governor of the Synthetic Organic Chemical Manufacturers Association, and the treasurer and a governor of the Drug & Chemical Club. He is a past director of the New York Board of Trade.

The Board of Directors of the company also decided to continue the Management Committee which was appointed on December 9, 1949, after the death of Mr. Armour. The members of this Committee, in addition to Mr. Remensnyder, are R. Lulek and S. Askin, both vice-presidents and directors of the company, and P. van der Stricht, the secretary and a director of the company.

• Standard for Water Repellent Submitted

A Commercial Standard for Water Repellent Textile Fabrics for Outerwear Apparel has been submitted by the Commodity Standards Division of the National Bureau of Standards to manufacturers, distributors, users and other interested groups for their consideration and acceptance.

This recommended commercial standard, initiated by the Textile Fabrics Association, covers test methods and ratings for the resistance of textile fabrics to penetration by water and the retention of that characteristic after laundering and/or cleaning. It is not intended that the standard be applicable to coated fabrics and fabrics containing 50 precent or more of wool.

It recommends two main classifications for water repellent fabrics; (1) for fabrics the finish of which will withstand at least three normal washings or three normal cleanings and, (2) fabrics which require retreatment after laundering or cleaning. Under each of these classifica-

tions the recommended standard covers three qualities of water repellency—fabrics which will give satisfactory protection in light showers, moderate rain, and heavy rain, as defined therein.

Mimeographed copies of the recommended standard, TS-4863, are available upon request to the Commodity Standards Division, National Bureau of Standards, Washington 25, D. C.

• A.S.T.M. Meeting Dates

The American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. has announced dates for its '50, '51 and '52 Annual Meetings as well as a schedule of several of their committee meetings.

The Annual Meetings are scheduled as follows:

1950—June 26-30, Atlantic City, N. J.
1951—June 18-22, Atlantic City, N. J.
1952—June 22-27, New York, N. Y.

Among other meetings are the following:

February 20-24, Committee D-2 on Petroleum Products and Lubricants, Washington, D. C.

February 27-March 3, Committee Week, Pittsburgh, Pa.

March 15-17, Committee D-13 on Textile Materials, New York, N. Y.

Week of March 20, Committee D-20 on Plastics, Old Point Comfort, Va.

March 21-22, Committee D-12 on Soaps and Other Detergents, New York, N. Y.

At the meeting of Committee D-12 on Soaps and Other Detergents, to be held at the Park Sheraton Hotel, several proposed new standards covering the testing and quality of various materials in the Committee's scope will be considered and other activities will be reviewed.

The Committee extends all interested in its work an invitation to attend the various subcommittee and main technical sessions.

A complete list of the meetings can be obtained from the Secretary, J. C. Harris, Monsanto Chemical Co., Nicholas Road, Dayton 7, Ohio. F. W. Smither, Chemist (Retired), National Bureau of Standards, Washington, is Chairman of the Committee, and Frederick Krassner, Department of the Navy, Brooklyn, is Vice-Chairman. In its personnel the Committee includes about 106 members concerned with the production and use of a variety of soaps and detergents.

Over 30 standard specifications, tests, and series of definitions have been developed by the Committee and published by the American Society for Testing Materials.

Committee D-12 has adopted the practice of concentrating its meetings in the Spring and considers this its annual meeting.

Dr. Pauline Berry Mack Giving the Address "The Medalist, The Scientist" at the 1949 A.A.T.C.C. Convention.

• Dr. Mack Awarded Garvan Medal

Dr. Pauline Beery Mack, director of the Ellen H. Richards Institute and professor of household chemistry at the Pennsylvania State College, will receive the 1950 Francis P. Garvan Medal honoring women in chemistry at the American Chemical Society's 117th national meeting in Detroit in April, it is announced by Dr. Ernest H. Volwiler, president of the Society. The gold medal will be presented at a general assembly of the Society in the Book-Cadillac Hotel on Monday evening, April 17.

Dr. Mack was cited particularly for her work on the calcium chemistry of bone density, which has constituted her chief personal contribution to chemical science. Her medal address in Detroit will be given at a special symposium on the physical chemistry of bone which has been arranged by the Society's Division of Physical and Inorganic Chemistry in connection with the Garvan Award. Dr. Mack's so-called microphotometric method of measuring the mineral content of bones has been applied by many other investigators in this country and abroad in varied studies in the fields of nutrition and medicine.

Under her direction, research workers at the Ellen H. Richards Institute conduct studies in the chemistry of food and nutrition, the chemistry of textiles and detergents, and the chemistry and physics of household equipment and material.

In the field of textile chemistry, studies at the Institute have included the chemistry of silk weighting, the chemistry of dye adsorption, the development of laboratory tests for textile performance to simulate conditions of wear, and the development of physical, chemical, and practical methods of measuring detergency efficiencies. The Ellen H. Richards Institute standard soiled fabrics for dry cleaning and laundry testing and research are widely used. Dr. Mack serves as general director of industrial fellowships for research on the chemistry nad physics of household equipment.

Born at Norborne, Mo., Dr. Mack received the A.B. degree in 1913 from Missouri State University. In 1919 Columbia University awarded her the A.M. degree, and in 1932 she received the Ph.D. from Penn State. In 1923, she married Dr. Warren Bryan Mack, professor and head of the Department of Horticulture at Penn State.

Dr. Mack is an active member of many honorary and professional organizations among which are: the Faraday Society of England, an organization for the study of pure and applied physical chemistry, Iota Sigma Pi, chemistry honor society (of which she was president in 1947), American Association for the Advancement of Science and the American Institute of Chemists, the American Chemical Society, American Society for Testing Materials, and the American Association of Textile Chemists and Colorists.

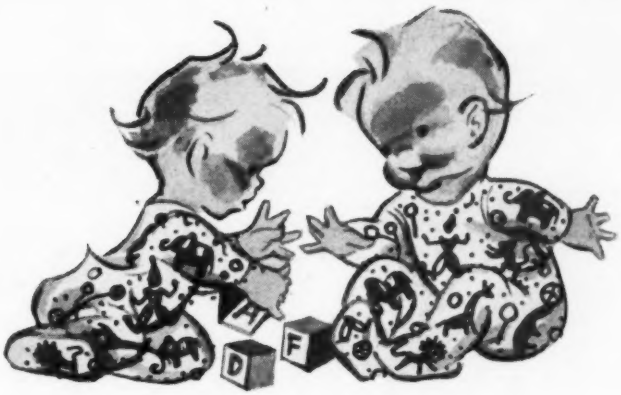
Matthew M. Gouger

• Gouger Named General Aniline Personnel Head

Matthew M. Gouger has been named Director of Personnel Relations of General Aniline & Film Corporation in an announcement by Dr. Gary R. Wagner, Vice President in Charge of Operations. Mr. Gouger, in his new post, takes over the duties and responsibilities of the Industrial Relations Department.

A native of Texas and an honor graduate of the University of Texas, Mr. Gouger joined General Aniline as Director of Industrial Relations for the General Aniline Works (Dyestuffs) Division a year ago. He had been Vice President in Charge of Personnel and Public Relations of the Glenn L. Martin Company, of Baltimore, Maryland, and was previously with Trans World Airlines and Pittsburgh Plate Glass Company as Director of Industrial Relations for those companies.

CALCOTEX RESIN-BONDED PIGMENTS FOR COTTON PRINTING



Designed for printing resin-bonded pigment by the water-in-oil emulsion system, the CALCOTEX* Colors represent a highly efficient combination of organic pigments and binders to provide superior fastness in cotton printing.

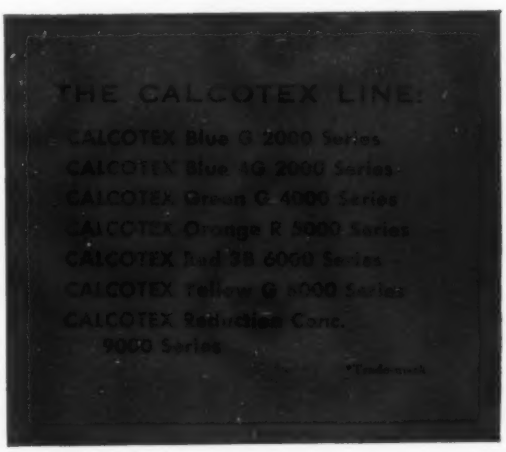
Use them on cotton percale for dress goods, on flannelettes, cotton plissé, sportswear, shirtings and specialty items.

The CALCOTEX Colors require no special aging process and can be printed either alone or in the same patterns with such products as Calconyls, etc., by the usual procedure.

As a leading manufacturer of both pigments and resins, Calco maintains a continuous research program for the improvement of these products. This is reflected in the high quality of Calco's resin-bonded pigments.

SEND FOR TECHNICAL BULLETIN

The coupon below will bring you Calco Technical Bulletin #777, "Coloring With Resin-Bonded Pigments," which is a very comprehensive write-up on this interesting subject. And in preparing your initial trials of CALCOTEX Colors, be sure to request the services of a member of the Calco Technical Service Staff. He can be of great help to you.


THE CALCOTEX LINE:
CALCOTEX Blue G 2000 Series
CALCOTEX Blue 4G 2000 Series
CALCOTEX Green G 4000 Series
CALCOTEX Orange R 5000 Series
CALCOTEX Red 3B 6000 Series
CALCOTEX Yellow G 6000 Series
CALCOTEX Reduction Conc.
9000 Series

Calco
REG. U.S. PAT. OFF.

AMERICAN Cyanamid COMPANY
CALCO CHEMICAL DIVISION
DYESTUFF DEPARTMENT
BOUND BROOK, NEW JERSEY

American Cyanamid Company
Calco Chemical Division
Bound Brook, New Jersey

Send me a free copy of your Technical Bulletin No. 777, "Coloring with Resin-Bonded Pigments."

Name_____

Company_____

Address_____

You're not gambling with

JORDAN CHEMICALS

The Jordan line embraces the old and new in chemistry from soaps and oils to the newest in synthetics and all featuring quality control for the protection of your quality and profits.

- **Pentoterge 100—a foremost detergent for wool scouring and soaping off.**
- **Rayocine—an oil type lubricant for the treatment of rayon and cotton.**
- **Pentocine and Arylpen — wetting out agents of highest activity.**

W. H. & F. JORDAN, JR., MFG. CO.
2126 EAST SOMERSET STREET, PHILADELPHIA 34, PA.

NAMICO

FINE TEXTILE SOAPS

•

Flakes - Powders - Solids
All Titers

•

SYNTHETIC DETERGENTS AND SPECIALTY COMPOUNDS

•

There's a NAMICO soap or synthetic for every scouring, fulling, soaping off, degumming, and finishing requirement.

National Milling & Chemical Co.
Industrial Soap Products Since 1896
4603 NIXON STREET, PHILADELPHIA 27, PA.

PHOTOVOLT Photoelectric REFLECTION METER

A truly practical precision instrument for color control on dyed fabrics, also for the measurement of fading and for whiteness and detergency tests.

Portable, rugged, simple to operate.

Write for Bulletin #605 to

PHOTOVOLT CORP.
95 Madison Avenue New York 16, N. Y.
Also: Colorimeters and pH Meters

CHEMICALS
O·M·B
INC. DYES

DYESTUFF MANUFACTURERS

Fast Color Salts
& Bases
Noted for their Solubility and Stability

Since 1917

OTTO B. MAY, INC.

DYER S. MOSS—Southern Representative

198-214 Niagara Street
Newark 5, New Jersey

2511 Lucena Street
Charlotte 6, North Carolina

TC

Serving the textile printing, finishing and dyeing industry with a complete range of quality detergents, finishes, printing gums, penetrants, softeners and specialties. Complete analytical and practical laboratory facilities.

Tex-Chem Company
20-21 Wagaraw Road
Fairlawn, N. J.

VANCIDES

The Fungicides and Bactericides that are SAFE to use

they're . . .

NON-TOXIC

NON-IRRITATING

STABLE • NON-VOLATILE

SEND FOR DESCRIPTIVE LITERATURE

R. T. VANDERBILT CO., INC. 230 Park Ave. New York 17, New York

HASTINGS LIGHT FAST VIOLET IRS—(C. I. 1073)

and

HASTINGS LIGHT FAST VIOLET 3RL

Excellent Level Dyeing Properties
Very Good Fastness to Light

Recommended for producing fast shades on
Ladies' Dress Goods, Carpet Yarn and Upholstery Materials.

ZINSSER & COMPANY, Inc.
ESTABLISHED 1897
Manufacturing Chemists
HASTINGS-ON-HUDSON NEW YORK

KNITTING MEN take a shine to Zurn's SURE CURE for SHINERS

on 60 gauge machines

Knitting mills are waving good-bye to "Shiners" with Bleached Glycerine Softener CUK in their 60 gauge machines. You need only this one solution to soften nylon sizing evenly, making yarn more pliable for knitting with proper tension. If desired Bleached Glycerine Softener CUK may be combined with Needle Oil NE for superior lubrication of needles and carrier tubes. Needles and tubes are kept free of nylon size, tube life is increased.

Equally effective on mono- or multi-filament nylon yarn.

GET DETAILS TODAY from

Zurnoil TEXTILE CHEMICALS

Specialties for
SCOURING
STRIPPING
PENETRATING
FINISHING
LUBRICATION

Oils for all textile conditioning requirements.

O. F. ZURN COMPANY
PHILADELPHIA 32, PA.
Knoxville, Tenn. • Hamilton, Ontario, Canada

Stainless Steel CYLINDERS

...accurate...true running

Blickman Built Stainless Steel drying cylinder . . . 60 inch diameter. Plate No. 7252

Stainless Steel drying rolls . . . high pressure steam, built to A S M E code specifications.

FOR TROUBLE-FREE SERVICE UNDER MODERN HIGH SPEED TEXTILE OPERATIONS

For protecting the fabrics you process, Blickman Built cylinders are being recommended and used by an increasing number of manufacturers of textile finishing machinery. The reason is simple. Blickman specializes in the fabrication of stainless steel cylinders to give you a more accurate, more dependable, safer cylinder. Our special plant equipment and controlled welding procedures assure rugged construction for long service. Blickman Built cylinders are available through many textile machine builders or through us.

- **DIMENSIONS**—Built in any diameters or lengths to meet your requirements.
- **FINISH**—Polished on our own automatic machines to as high as number 6 finish, if you require it.
- **CODE REQUIREMENTS**—Cylinders built to conform to local and ASME national board codes.
- **INSPECTION**—Tested at twice working pressure . . . thoroughly checked for leaks.
- **CONSTRUCTION**—Mechanically sized for accuracy and true running. Furnished with or without heads.
- **TYPES**—Dry cans, presetting cylinders, cooling cylinders, etc.

Specify Blickman Built cylinders through your textile machine builder . . . or send your inquiry direct to us. Quotations furnished promptly.

S. BLICKMAN, INC. 101 GREGORY AVENUE WEEHAWKEN, N. J.

Manufacturers of stainless steel textile equipment, dye boxes, linings, cylinders, dry cans, rolls, hoods, tanks.

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

BURK-SCHIER

BURKART-SCHIER CHEMICAL CO., CHATTANOOGA, TENN.

• CLASSIFIED ADVERTISEMENTS •

POSITION WANTED: Experienced dyer, graduate Philadelphia Tech., 1933. 10 years at Klugers New Process Dyeing & Finishing Co. Capable dyeing all mixed fabrics. jigs, boxes, pad work, multi-filament crepes, satins, taffetas, plied yarns, tissue failles, romaines, alpacas, luanas, gabardines, pigment crepes, all acetate crepes, Gross dyeing of all mixed fabrics. A great amount of discharge dyeing experience. Saponification work. Write Box No. 757.

POSITION WANTED: Do you need a good Dyer? I have 25 years' experience in laboratory and mill. Have wide knowledge of all classes of cotton dyes on raw stock, yarn in all forms, piece dyeing on winch and colored piece bleaching. Growing family I wish to bring up in their own country, reason for change. Will go anywhere in United States. Salary secondary. Write Box No. 778.

WANTED: Salesman for textile chemical specialties in Massachusetts, Connecticut, and Rhode Island to represent leading New Jersey chemical manufacturer. Good salary and opportunity for right man. Replies confidential. Write Box No. 779.

WANTED: Dyestuff Laboratory Technician, high school chemistry and general laboratory dyestuff experience required. $35-$40 per week to start. Northern New Jersey area. Write Box No. 780.

POSITION WANTED: Chemical Engineer,. B.S., Columbia University, June 1949, part of M.S. Excellent school record. Veteran, 25 years, married, desires opportunity anywhere in U. S. A. Write Box No. 782.

WANTED: High calibre man. Thoroughly experienced in practical vat color application on modern continuous dyeing units. Must also be able to direct laboratory investigation and testing. Excellent opportunity. Metropolitan area. Give full details. Write Box No. 783.

TEXTILE CHEMIST WANTED: Fine opportunity to broaden experience in technical service on new wool stabilization process. Headquarters in outstanding new laboratories. Experience in wet finishing of wool desirable, but will consider others. Write Box No. 784.

POSITION WANTED: Full fashioned hosiery dyer employed at the present time would like to make change. Philadelphia or vicinity preferred. Full particulars given upon request. Write Box No. 786.

TEXTILE CHEMIST: Old and well established manufacturer of specialty compounds for sizing, finishing and printing, desires a capable, imaginative and experienced chemist for research and development in Providence or New York area. Please state complete qualifications and salary requirements. Replies confidential. Write Box No. 787.

POSITION WANTED: Finisher for twenty-five years with nationally known plants. Experienced with all types of synthetic spun silk, nylon, and filament fabrics. Also experience with all of the types of resin finishes. Write Box No. 788.

POSITION WANTED: University chemistry graduate, with fine supplementary textile background. Year and a half experience at piece goods and skein dyeing. Interested primarily in position offering opportunity for practical experience in either dye plant or laboratory. Age 25, single and free to relocate. Write Box No. 789.

WANTED: Experienced shift foreman dyer with laboratory background and experienced on upholstery piece goods for a southern dyeing and finishing plant. State full history, qualifications, references, and salary expected. All replies will be held in strict confidence. Write Box No. 790.

CHEMICALS

FOR THE

TEXTILE INDUSTRY

YOR

CHEMICAL CO.

625 LAWRENCE STREET

LOWELL -- MASSACHUSETTS

• CLASSIFIED ADVERTISEMENTS •

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery wanted or for sale—the rate is $7.50 per column inch or less per insertion.

POSITION WANTED: Young man, married, thoroughly experienced in dyeing, printing, and processing of cottons desires responsible position with established or growing, reliable concern. Recently chief chemist and superintendent of large New England finishing plant. Write Box No. 791.

NOTICE

CLASSIFIED ADVERTISEMENTS

ARE RESTRICTED TO

HELP WANTED — POSTIONS WANTED

MACHINERY (Wanted or For Sale)

OTHER TYPE COPY WILL NOT BE ACCEPTED

American Dyestuff Reporter

GLYCERINE

Free booklet tells where it fits in your business!

In hundreds of applications from sizing to finishing, versatile glycerine is playing an increasingly important role in the textile industry . . . and in many of these applications suggested in the booklet, glycerine can materially improve your product!

The story is told in one informative, up-to-date booklet—"Why Glycerine for Textiles?"

Contains compact information on the physical properties of glycerine . . . its origin, development and chemistry . . . grades and their applications. 12 pages of practical, useful data—yours for the asking! Whether you're in management, production, or research . . . an expert on glycerine or thoroughly unfamiliar with the subject—you'll want this informative booklet. Write for your free copy—today!

GLYCERINE PRODUCERS' ASSOCIATION, DEPT. 13

295 Madison Ave. • New York 17, N. Y.

IT'S WHAT IS IN THE DRUM THAT MAKES THE DIFFERENCE

Less Handling with

AFTER CHLOR

Eliminates 3 to 5 Handlings

Bleach with Hypochlorite Rinse and use

AFTER CHLOR

That's All!

SEND FOR SAMPLES • INFORMATION • So. Office 617 Johnston Bldg. Charlotte, N. C.

RICHMOND OIL, SOAP AND CHEMICAL COMPANY INC.

Export Agents HOWARD G. GODFREY AND CO., INC. 456 Fourth Ave. N. Y. 16, N. Y. • Cable Address Godfreyarn

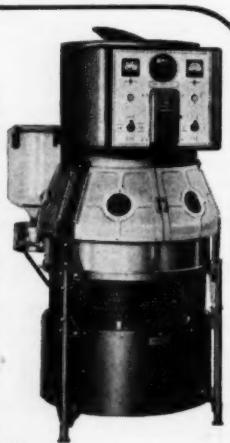
1041-43 FRANKFORD AVE. PHILADELPHIA 25, PA.

Fine fabrics

. . . are Atlas-Ometer tested . . . .

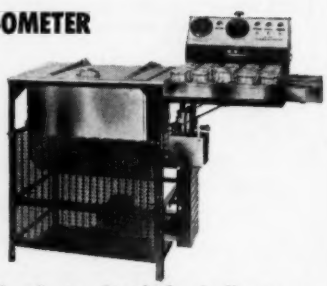
Fading, dimensional changes and loss in tensile strength due to sunlight, washing, dry cleaning and outdoor exposure are predetermined in the laboratory enabling the textile chemist and colorist to guarantee the permanence of the fine textured beautiful fabrics available today.

ATLAS FADE-OMETER



The recognized standard testing machine for determining the fastness to light of dyestuffs and dyed fabrics. Specimens are rotated around the Atlas Enclosed Violet Carbon Arc—the closest approach to natural sunlight—in masked holders. Temperatures automatically controlled to within ±3° F. and humidity regulated by a constant water level according to requirements of the test. Operation is completely automatic without attention from operator; can be left in continuous operation overnight.

ATLAS LAUNDER-OMETER



The standard laboratory washing machine of A.A.T.C.C. for testing color fastness, staining, shrinking, resistance to washing and mechanical action. All factors including washing action can be carefully controlled and reproduced identically at any time. The new preheating loading table increases accuracy of tests by starting all samples at uniform temperature.

RESEARCH MODELS—Two new models for research testing have recently been added to the Atlas line of standard Launder-Ometers. These units are designed to accommodate larger samples, allowing more accurate shrinkage testing, and are available with capacities ranging from 20 pint to 6 half-gallon jars. Both machines may be supplied with vari-speed drive units for operation between 10 and 50 r. p. m.

Manufacturers of the Twin Arc and the X1A WEATHER-OMETERS

ATLAS ELECTRIC DEVICES CO.

361 WEST SUPERIOR STREET, CHICAGO 10, ILL.

Originators and manufacturers of accelerated testing devices for over a quarter of a century.

● INDEX TO ADVERTISERS ●

Aktivin Div., The (Heyden Chemical Corp.)	
Alco Oil & Chemical Corp.	
Althouse Chemical Co., Inc.	Second Cover
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	III
American Cyanamid Co. (Ind. Chem. Div.)	Back Cover
American Polymer Corporation	
Arkansas Company, Inc.	XVIII
Arnold, Hoffman & Co., Inc.	
Atlantic Chemical Co., Inc.	XIII
Atlantic Refining Co.	XVII
Atlas Electric Devices Co.	XXXII
Barium Reduction Corp.	
Bick & Co., Inc.	
Blickman, Inc., S.	XXIX
Burkart-Schier Chemical Co.	XXX
Butterworth & Sons Co., H. W.	
Calco Chemical Division, American Cyanamid Co.	XXV
Calgon, Inc.	XII
Campbell & Co., Inc., John	
Carbic Color & Chemical Co., Inc.	
Ciba Company, Inc.	
Colgate-Palmolive-Peet Company	
Commonwealth Color & Chemical Co.	
Crucible Steel Co. of America	
Drew & Co., Inc., E. F.	
Du Pont de Nemours & Co., E. I.	
Dyestuffs Division	Front Cover
Emery Industries, Inc.	
Fancourt & Co., W. F.	
Gaston County Dyeing Machine Co.	
Geigy Company, Inc.	
General Chemical Div., Allied Chemical & Dye Corp.	
General Dyestuff Corp.	XV
Girdler Corp., The	
Glycerine Producers Association	XXXI
Grinnell Co., Inc.	Third Cover
Gross & Co.	
Gurley, W. & L. E.	XXXIV
Hart Products Corp.	XXII
Hercules Powder Co.	
Heyden Chemical Corp.	
Hilton-Davis Chemical Co.	
Hinnekens Machine Company, Inc.	
Hooker Electrochemical Co.	IV
Houghton & Co., E. F.	
International Nickel Co., Inc.	XVI
International Salt Co., Inc.	
Jordan, Jr. Mfg. Co., W. H. & F.	XXVI
Kali Mfg. Co.	
Kearny Manufacturing Company, Inc.	
Kelco Co.	
Koppers Company, Inc.	
Laurel Soap Mfg. Co., Inc.	

RS
cond Cover
III
Back Cover
XVIII
XIII
XVII
XXXII
XXIX
XXX
XXV
XII
Front Cover
XV
XXXI
Third Cover
XXXIV
XXII
IV
XVI
XXVI

Reduces Rayon 'Seconds'

'Hard Size' is minimized by a slower congealing warp size

Try a quick run-off in your mill. You'll find that **SPUNJEL** – a specially prepared warp sizing gum for spun rayon – will not congeal or set-up in the feed line or in the size box during normal operation. It was developed to minimize imperfection rejects caused by 'hard size.'

Photo courtesy of JANTZEN

SPUNJEL can also be worked into your present formula to greatly minimize 'set marks.' Its high adhesiveness and strong, flexible surface film actually increases the tensile strength of the yarn.

We'd like to test these NATIONAL Textile Specialties and Starches:

- ☐ Please send test samples
- ☐ Have a representative call
- ☐ SPUNJEL (described above)
- ☐ AMBERTEX M for screen and machine printing
- ☐ FLOTEX to replace natural printing gums
- ☐ FLOCK ADHESIVE 970 for chenille printing
- ☐ FARILON for Rapidogen printing and backfilling
- ☐ FIBERJEL V for filament viscose sizing
- ☐ CLEARFILM for bright, lustrous finishes on cotton and rayons
- ☐ VAT THICKENER 36 for rayon and cotton

Mr._____

Company_____

Address_____

City_____ Zone_____ State_____

Test your fabrics these 3 ways...

Gurley Air Permeability Test for Standard Textiles

Fifteen seconds is all it takes to make an air permeability test with the GURLEY PERMEOMETER* on fabrics which permit a passage of from 1 to 400 cu. ft. of air/min/sq. ft. at a pressure drop of 0.5".

Wind-proofness, coating penetration, filler-retention and water-resistance are some of the many fabric properties accurately measured with this versatile instrument. Send for Bulletin 1600.

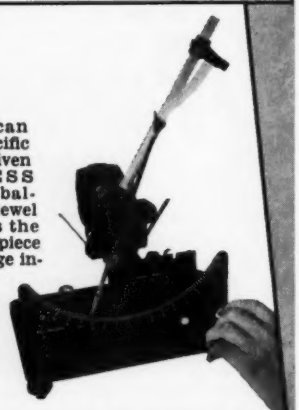
*Conforms to ASTM "Tent. Meth. of Test for Air Permeability of Text. Fabrics"—D737-48T

Gurley Air-Resistance Test of Tightly Woven Fabrics

Windproof cloth, gabardine, canvas, poplin and many other very impermeable fabrics below the capacity of the Gurley Permeometer, are readily tested for porosity, air-resistance and air permeability in the GURLEY DENSOMETER. Easy-to-use and accurate in its readings, the Densometer has become preferred testing equipment in textile laboratories everywhere. Described in our Bulletin 1600.

Gurley Stiffness and Pliability Tests

Stiffness and softness can now be expressed in specific figures with the motor-driven GURLEY STIFFNESS TESTER. A precision-balanced pointer pivots in jewel bearings and indicates the stiffness factor of a test piece on a sine scale. The range includes practically all textile materials. The stiffening action of starching, laundering, or other treatments is accurately measured. Write for Bulletin 1430.



W. & L. E. GURLEY, 512 FULTON ST., TROY, N. Y.

SEND FOR CATALOGS

GURLEY

Scientific Instrument Makers Since 1845

● INDEX TO ADVERTISERS ●

Leatex Chemical Co.	
Leeds & Northrup Co.	XXXV
Manhattan Storage & Warehouse Co.	
Mathieson Chemical Corp.	VIII
May, Inc., Otto B.	XXVII
Maywood Chemical Works	
Metalsmiths Div., Orange Roller Bearing Co., Inc.	
Monsanto Chemical Co.	X, XI
National Aniline Division, Allied Chemical & Dye Corp.	V
National Milling & Chemical Co.	XXVI
National Starch Products	XXXIII
Nopco Chemical Co.	XIV
Nova Chemical Corp.	
Nyanza Color & Chemical Co., Inc.	
Onyx Oil & Chemical Co.	VII
Pabst Sales Co.	
Perkins & Sons, Inc., B. F.	
Photovolt Corp.	XXVI
Pfister Chemical Works, Inc.	
Procter & Gamble	
Prufcoat Laboratories, Inc.	
Reading Scientific Company	
Refined Products Corp.	XX\
Richmond Oil Soap & Chemical Co., Inc.	XXXI
Rohm & Haas Company	XXXVI
Royce Chemical Co.	
Rumford Div., Heyden Chem Corp.	
Sandoz Chemical Works, Inc.	
Scholler Bros., Inc.	XX
Sharples Chemicals, Inc.	
Socony-Vacuum Oil Co., Inc.	
Solvay Sales Div., Allied Chemical & Dye Corp.	XIX
Standard Brands, Inc.	
Standard Chemical Products, Inc.	
Standard Corrugated Case Corp.	
Tennessee Eastman Corp.	
Tex-Chem Co.	XXVII
Trent Tube Co.	
Turner & Co., Joseph	XXXV
Union Carbide and Carbon Corp., U. S. Vanadium Corp., Unit...	
United Chemical Products Corp.	
U. S. Vanadium Corp., Unit of Union Carbide & Carbon Corp...	
Vanderbilt Co., Inc., R. T.	XXVIII
Van Vlaanderen Machine Co.	
Virginia Smelting Co.	
Wallerstein Co., Inc.	XXIV
Winthrop-Stearns, Inc.	
Wolf & Co., Jacques	IX
Wyandotte Chemicals Corp.	
Yor Chemical Co.	XXXI
Young Co., J. S.	XXXV
Young Aniline Works, Inc.	
Zinsser & Co., Inc.	XXVIII
Zurn Company, O. F.	XXIX

RS
XXXV
VIII
XXVII
X, XI
V
XXVI
XXXIII
XIV
VII
XXVI
XX\
XXXI
XXXVI
XX
XIX
XXVII
XXXV
XXVIII
XXIV
IX
XXXI
XXXV
XXVIII
XXIX

HERE'S YOUR HEADQUARTERS FOR

Acetate Dyes Intermediates

Let Turner be your headquarters for this complete quality line of acetate dyes and intermediates. The Para Amino Acetanilide, Quinizarine and PNOT are excellent intermediates for many dyestuff processes.

Investigate these Quality Products

ACETATE DYES • QUINIZARINE
PARA AMINO ACETANILIDE
PARA NITRO ORTHO TOLOUIDINE
(Fast Scarlet G Base)

Selling Agents for CROWN CHEMICAL COMPANY

JOSEPH TURNER & CO
RIDGEFIELD, NEW JERSEY
63 EXCHANGE PLACE, PROVIDENCE, R. I.
435 N. MICHIGAN AVE., CHICAGO 11, ILL.
Direct New York Telephone: CHickering 4-7531

LOGWOOD BLACK
FOR
LEATHER • WOOL • SILK
COTTON • FUR • HAIR
PIGMENTS

DEPENDABLE SOURCE OF SUPPLY
ECONOMICAL-RELIABLE
LOGWOOD HEMATINE QUEBRACHO
TANNIC ACID SUMAC QUERCITRON
FUSTIC GAMBIER FLAVINE

YOUNG EXTRACTS--SERVING THE INDUSTRY SINCE 1869
THE J. S. YOUNG COMPANY
2701-2733 BOSTON ST., BALTIMORE 24, MD.
50 EAST 13th ST., PATERSON, N. J.

NOW . . . fast, precise polarographic analysis by new Electro - Chemograph

Designed for rapid, accurate polarographic analysis, the new L&N Type E Electro-chemograph features one piece console design incorporating a built in Speedomax Recorder. The instrument automatically plots diffusion current as a function of voltage and is convenient for both research and industrial process control.

Operation is fast and convenient. All controls are centralized on one panel. The instrument has four degrees of damping, and has eleven current ranges handling 0 to 100 microamperes. There are three polarizing voltage ranges: 0 to —2, —1 to —3 and +1 to —1 volts. Any of these ranges can be reversed to cover both anodic and cathodic polarization. The equipment is shielded against electrical pickup, and is not affected by vibration. Normally it is supplied for a-c operation, but it can be supplied for use with batteries.

Further information is available in Folder E-90(1). Write Leeds & Northrup Co., 4965 Stenton Ave., Phila. 44, Penna.

LEEDS & NORTHRUP COMPANY, 4965 STENTON AVE., PHILA., PA.
LEEDS & NORTHRUP
MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES
Jrl. Ad. EM 9-90(1d)

It's Thrifty to Use TRITON X-100 in Textile Wet Processing

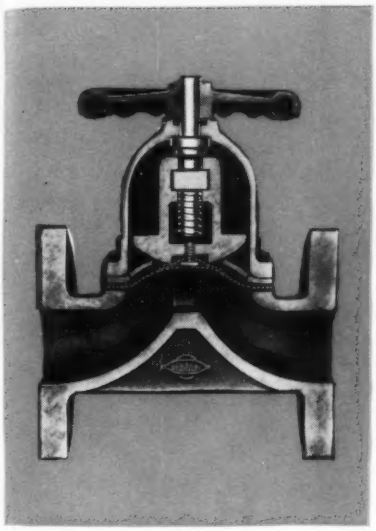
Be wise and thrifty. Write today for full details of this low cost, versatile surface-active agent—TRITON X-100.

CHEMICALS FOR INDUSTRY

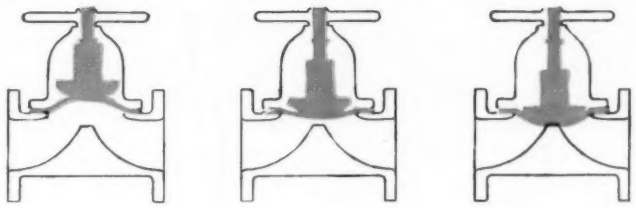
ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

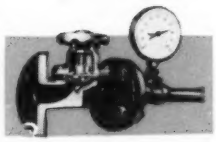


If you need a diaphragm valve you need all the advantages of diaphragm closing



Check these popular features of

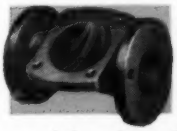
GRINNELL-SAUNDERS DIAPHRAGM VALVES



Diaphragm gives leak-tight closure against grit, scale, solid matter . . . Even when something as substantial as an 8-penny nail is trapped on the weir of a rubber lined valve, as illustrated, the resilient diaphragm, plus the large area of contact, gives leak-tight closure against pressure or vacuum.

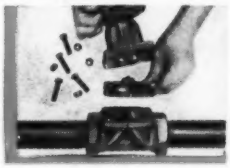
Diaphragm lifts high for streamlined flow in either direction . . . Smooth, streamlined passage, without pockets, prevents trapping of sludge and reduces frictional resistance to a minimum—irrespective of direction of fluid flow. No disc holder in fluid stream. Grinnell-Saunders Diaphragm Valves are self-draining when installed with the spindle at 15 degrees above the horizontal position.

Diaphragm absolutely isolates working parts from fluid . . . There's no "if" about the way a continuous, one-piece diaphragm seals off the working parts from fluids; no perforation or puncture in the diaphragm where fluid or gas can possibly leak by the valve spindle. No sticking, clogging or corroding of working parts. Valve lubricant cannot contaminate the fluid in the line.



Diaphragm, body and lining materials to meet particular conditions . . . Bodies stocked in cast iron, malleable iron, stainless steel, bronze and aluminum: other materials on special orders. Valve bodies lined with lead, glass, natural rubber or neoprene. Diaphragm materials of natural rubber or synthetics. Working pressure, 150 lbs.; maximum temperature, 180°F.

Diaphragm is only part that normally wears and needs replacement . . . Depending on the type of service, it may last for years, particularly since the compressor and finger plate combine to support the diaphragm in all positions. The diaphragm can be replaced quickly without removing valve from line. No refacing or reseating. No disc holder to require tightening or replacing. No packing glands to demand attention.



Write today for the new Grinnell-Saunders Diaphragm Valve Catalog 4-S.

100th ANNIVERSARY — WHENEVER PIPING IS INVOLVED

GRINNELL

Grinnell Company, Inc., Providence 1, R. I. Warehouses: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston • Long Beach Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Pocatello • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

DO NOT CIRCULATE

GREENVILLE PUBLIC LIBRARY

DO NOT CIRCULATE

DO NOT CIRCULATE

fabrics that make fashions

are finished with

Cyanamid Textile Chemicals

For the softness, suppleness, good dye affinity and many other characteristics that keep fabrics moving from mill to market, specify Cyanamid Textile Chemicals.

Some will simplify and accelerate your processes; others will simplify and accelerate your sales.

A complete line is available, all quality-controlled.

So for *penetrants, softeners, finishes, sizing compounds, wetting agents* and other specialties and heavy chemicals that will make your processes easier, your fabrics better, call on Cyanamid.

Cyanamid's Textile Chemicals include:
DECERESOL® Wetting Agents, NO-ODOROL® Finishing Oils, Penetrants, Sizing Compounds

AMERICAN Cyanamid COMPANY

INDUSTRIAL CHEMICALS DIVISION, Dept. E2

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.